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KÖŞEGENLEŞTİRİLEBİLİR MATRİSLERİN LİNEER BİLEŞİMLERİNİN KARAKTERİZASYONU İÇİN BİR YÖNTEM VE ÖZEL TİPLİ MATRİSLERE UYGULAMALARI

DOKTORA TEZİ

Emre KİŞİ

Enstitü Anabilim Dalı	**:**	**MATEMATİK**
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Tez Danışmanı	**:**	**Prof. Dr. Halim ÖZDEMİR**

Mayıs 2018

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Bu tez 24/05/2018 tarihinde aşağıdaki jüri tarafından oybirliği ile kabul edilmiştir.

Prof. Dr.
Ahmet Yaşar ÖZBAN
Jüri Başkanı

Prof. Dr.
Halim ÖZDEMİR
Üye

Prof. Dr.
Halis AYGÜN
Üye

Doç. Dr.
Nesrin GÜLER
Üye

Doç. Dr.
Murat SARDUVAN
Üye

BEYAN

Tez içindeki tüm verilerin akademik kurallar çerçevesinde tarafımdan elde edildiğini, görsel ve yazılı tüm bilgi ve sonuçların akademik ve etik kurallara uygun şekilde sunulduğunu, kullanılan verilerde herhangi bir tahrifat yapılmadığını, başkalarının eserlerinden yararlanılması durumunda bilimsel normlara uygun olarak atıfta bulunulduğunu, tezde yer alan verilerin bu üniversite veya başka bir üniversitede herhangi bir tez çalışmasında kullanılmadığını beyan ederim.

Emre KİŞİ

24/05/2018

ÖNSÖZ

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İÇİNDEKİLER

SİMGELER VE KISALTMALAR LİSTESİ

$\mathbb{N}$	: Doğal sayılar kümesi
$\mathbb{C}$	: Karmaşık sayılar kümesi
$\mathbb{C}^*$	: Sıfırdan farklı karmaşık sayılar kümesi
$\mathbb{C}^n$	: n boyutlu karmaşık vektörler kümesi
$\mathbb{C}_{m\times n}$	: $m\times n$ boyutlu karmaşık matrisler kümesi
$\mathbb{C}_n$	: $n\times n$ boyutlu karmaşık matrisler kümesi
I_n	: $n\times n$ boyutlu birim matris
$\mathbf{0}$	: Uygun boyutlu sıfır matris
i	: $\sqrt{-1}$
A^T	: A matrisinin devriği
$\overline{A}$	: A matrisinin karmaşık eşlenik
A^*	: A matrisinin eşlenik devriği
A^{-1}	: A matrisinin tersi
$A^\#$	: A matrisinin grup tersi
$A^\dagger$	: $A^\dagger$ matrisinin Moore Penrose tersi
A^D	: A^D matrisinin Drazin tersi
$\sigma(A)$	: A matrisinin spektrumu
$A\oplus B$	: A ve B matrislerinin direkt toplamı
$rk(A)$	: A matrisinin rankı
$\in$	: Elemanıdır
$\notin$	: Elemanı değildir
$\subseteq$	: Alt kümesidir
$\bigcup$	: Birleşim

$\binom{n}{r}$	: n nin r li kombinasyonu
(a,b)	: a , b sıralı ikilisi
$\Rightarrow$	: Gerektirir
$\Leftrightarrow$	: Gerekli ve yeterli koşul

TABLOLAR LİSTESİ

ÖZET

Anahtar Kelimeler: Köşegenleştirilebilir matrisler, değişmelilik, spektrum, algoritma, lineer denklem sistemleri

İlk bölümde, bazı özel tipli matrislerin uygulamalı bilimlerdeki kullanım alanlarından bahsedilmektedir. Ayrıca literatürde birçok yazar tarafından çalışılan özel tipli matrislerin lineer bileşimlerinin karakterizasyonu problemleri ile ilgili sonuçlar, tablolar yardımıyla özetlenmektedir. İkinci bölümde, tezin esas sonuçlarının ortaya konduğu üçüncü ve dördüncü bölümlerde kullanılacak olan temel kavramlar ve bazı teoremler verilmektedir.

Üçüncü bölüm çalışmanın omurgasını oluşturmaktadır. Bu bölümde, sonlu sayıda değişmeli köşegenleştirilebilir matrisin lineer bileşiminin spektrumunu karakterize etmek için bir kombinatorik yöntem verilmekte ve bu yöntem temel alınarak bir algoritma geliştirilmektedir.

Dördüncü bölümde, iki değişmeli kübik matrisin lineer bileşiminin kübikliği, iki değişmeli kuadripotent matrisin lineer bileşiminin kuadripotentliği, karşılıklı değişmeli üç tripotent matrisin lineer bileşiminin tripotentliği, ve karşılıklı değişmeli dört involutif matrisin lineer bileşiminin tripotentliği problemleri üçüncü bölümde geliştirilen Algoritma 3.1 yardımıyla çözülmektedir.

A METHOD FOR CHARACTERIZING THE LINEAR COMBINATIONS OF DIAGONALIZABLE MATRICES AND ITS APPLICATIONS TO SPECIAL TYPES OF MATRICES

SUMMARY

Keywords: Diagonalizable matrices, commutativity, spectrum, algorithm, systems of linear equations

In the first chapter, the usage areas of some special types of matrices in applied sciences are mentioned. Moreover, the results related to the problems of characterizing the linear combinations of special types of matrices which are studied by many authors in the literature are summarized with the help of the tables. In the second chapter, the basic concepts and some theorems that will be used in the third and fourth chapters where the main results of the thesis are established are given.

The third chapter forms the backbone of the study. In this chapter, a combinatorial method for characterizing the spectrum of the linear combinations of finitely many commutative diagonalizable matrices is given and then an algorithm which is based on this method is developed.

In the fourth chapter, the problems of cubicity of linear combinations of two commutative cubic matrices, quadripotency of linear combinations of two commutative quadripotent matrices, tripotency of linear combinations of three tripotent matrices that mutually commute, and tripotency of linear combinations of four involutive matrices that mutually commute are solved via the Algorithm 3.1 that developed in the third chapter.

BÖLÜM 1. GİRİŞ VE LİTERATÜR ÖZETİ

1.1. Giriş

Özel tipli matrisler matematik, fen ve mühendislik gibi bilimlerin birçok alt bilim dalında karşımıza çıkmaktadır. Örneğin, istatistikte A $n\times n$ boyutlu reel ve simetrik bir matris ve $\mathbf{x}$ vektörü de çok değişkenli $N_n(\mathbf{0}, I_n)$ normal dağılımına sahip $n\times 1$ boyutlu rastgele bir reel vektör ise, bu durumda $\mathbf{x}^T A\mathbf{x}$ kuadratik formunun ki-kare dağılımına sahip olmasının gerekli ve yeterli koşulu A matrisinin idempotent, iki bağımsız ki-kare dağılımının farkı olarak yazılabilmesinin gerekli ve yeterli koşulu A matrisinin tripotent olmasıdır [1]. Kuantum mekaniğinde kullanılan Pauli spin matrisleri $\begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$ involutiftir [2, p. 495]. Ayrıca, kriptolojide Hill yöntemiyle şifreleme yaparken involutif matris kullanılması tavsiye edilir. Çünkü Hill yönteminde şifreli metni çözmek için anahtar matrisin tersinin bulunması gerekmektedir ve anahtar matris olarak tersi kendisine eşit olan bir matris seçmek çok kullanışlı olacaktır [3]. *k*-potent matrisler ise dijital görüntü şifrelemede karşımıza çıkmaktadır [4].

1.2. Literatür Özeti

Bu kısımda literatür bilgisi kısaca özetlenecektir. Özel tipli matrislerin lineer bileşimleri ne zaman yine bir özel tipli matris olur? Bu problem son yıllarda birçok yazar tarafından farklı özel tipli matrisler için ele alındı ve birçok çalışma yapıldı. Bu sonuçları aşağıdaki tablolar ile özetlemek istiyoruz. Önce literatürde ele alınan başlıca lineer bileşimleri belirtelim. X_1, X_2 ve $X_3 \in \mathbb{C}_n$ olmak üzere

$$X = c_1X_1 + c_2X_2 \tag{1.1}$$

veya

$$X = c_1X_1 + c_2X_2 + c_3X_3 \tag{1.2}$$

olsun. Tablo 1.1. (1.1) lineer bileşimi için verilen sonuçları ve Tablo 1.2. (1.2) lineer bileşimi için verilen sonuçları özetlemektedir. Tablolarda, genel olarak $i = 1,\ 2$, $j = 1,\ 2,\ 3$ ve $k = 2,\ 3,\ 4, \ldots$ şeklindedir.

Tablo 1.1. (1.1) lineer bileşimine ilişkin bazı çalışmalar

	$X_1X_2 = X_2X_1$	$X_1X_2 \neq X_2X_1$
$X^2 = X$	$X_i^2 = X_i$ [5] $X_1^2 = X_1$ ve $X_2^3 = X_2$ [6] $X_i^2 = I_n$ [7] $X_1^3 = X_1$ ve $X_2^2 = I_n$ [8] $X_i^3 = X_i$ [9] $X_1^2 = X_1$ ve $X_2^k = X_2$ [10]	$X_i^2 = X_i$ [5] $X_1^2 = X_1$ ve $X_2^3 = X_2$ [6] $X_i^2 = I_n$ [7] $X_1^3 = X_1$ ve $X_2^2 = I_n$ [8] $X_1^2 = X_1$ ve $X_2^k = X_2$ [11]
$X^2 = I_n$	$X_i^2 = X_i$ [7] $X_i^2 = I_n$ [7] $X_i^3 = X_i$ [7] $X_1^3 = X_1$ ve $X_2^2 = I_n$ [8]	$X_i^2 = X_i$ [7] $X_i^2 = I_n$ [7] $X_1^3 = X_1$ ve $X_2^2 = I_n$ [8]
$X = X^{\#}$	$X_i^2 = X_i$ [12] [13]	$X_i^2 = X_i$ [12] [13]
$X = X^{\dagger}$	$X_i = X_i^{\dagger}$ [14]	$X_i = X^{\dagger}$ [14]
$X^3 = X$	$X_i^2 = I_n$ [7] $X_i^3 = X_i$ [9] [15]	
$X^2 = X^*$	$X_i^2 = X_i^*$ [16] [17]	$X_i^2 = X_i^*$ [16] [17]
$X^2 = X^{\dagger}$	$X_i^2 = X_i^{\dagger}$ [18]	

Tablo 1.1. (Devamı)

	$X_1X_2 = X_2X_1$	$X_1X_2 \neq X_2X_1$
$X^k = X$	$X_i^2 = I_n$ [19]	
$X^k = X^*$	$X_i^k = X_i^*$ [17] $X_i^2 = X_i = X_i^*$ [17]	
$X^{k-1} = X^\#$	$X_i^2 = X_i$ [20]	$X_i^2 = X_i$ [20]
$KX^{k+1}K = X$, $K^2 = I_n$	$KX_i^{k+1}K = X_i$, $K^2 = I_n$ [21]	
$(X-\alpha I_n)(X-\beta I_n) = \mathbf{0}$, $\alpha, \beta \in \mathbb{C}$, $\alpha \neq \beta$	$(X_i-\alpha_i I_n)(X_i-\beta_i I_n) = \mathbf{0}$, $\alpha, \beta \in \mathbb{C}$, $\alpha_i \neq \beta_i$ [22]	$(X_i-\alpha_i I_n)(X_i-\beta_i I_n) = \mathbf{0}$, $\alpha, \beta \in \mathbb{C}$, $\alpha_i \neq \beta_i$ [22]
$(X-\alpha P)(X-\beta P) = \mathbf{0}$, $\alpha, \beta \in \mathbb{C}$, $\alpha \neq \beta$, $P^2 = P$	$(X_i-\alpha_i I_n)(X_i-\beta_i I_n) = \mathbf{0}$, $\alpha, \beta \in \mathbb{C}$, $\alpha_i \neq \beta_i$ [23]	

Tablo 1.2. (1.2) lineer bileşimine ilişkin bazı çalışmalar

	$X_1X_2 = X_2X_1$ $X_1X_3 = X_3X_1$ $X_2X_3 = X_3X_2$	$X_1X_2 = X_2X_1$ $X_1X_3 = X_3X_1$ $X_2X_3 \neq X_3X_2$	$X_1X_2 = X_2X_1$ $X_1X_3 \neq X_3X_1$ $X_2X_3 = X_3X_2$	$X_1X_2 = X_2X_1$ $X_1X_3 \neq X_3X_1$ $X_2X_3 \neq X_3X_2$
$X^2 = X$	$X_j^2 = X_j$ $X_1X_2 = X_2X_1 = \mathbf{0}$ [24] $X_j^2 = X_j$ [25] [26]	$X_j^2 = X_j$ $X_1X_2 = X_2X_1 = \mathbf{0}$ [24] $X_j^2 = X_j$ [25] [26]	$X_j^2 = X_j$ $X_1X_2 = X_2X_1 = \mathbf{0}$ [24] $X_j^2 = X_j$ [25]	$X_j^2 = X_j$ $X_1X_2 = X_2X_1 = \mathbf{0}$ [24] $X_j^2 = X_j$ [25]
$X^3 = X$	$X_i^2 = I_n$ ve $X_3^3 = X_3$ [27] $X_i^3 = X_i$ ve $X_3^2 = I_n$ [28]			

Literatürde özel matrislerin lineer bileşimlerinin karakterizasyonu problemlerinde kullanılan iki ana yöntem vardır. Birinci yöntemde lineer bileşimdeki matrisler sağdan veya soldan uygun matrisler ile çarpılarak, diğer bir deyişle doğrudan aritmetik ve cebirsel işlemlerle ilerleyerek, matrisler ve katsayılar üzerinde bazı kısıtlayıcı eşitlikler elde edilir. Sonuçlar, elde edilen bu eşitliklerin teker teker ele alınmasıyla ortaya konulur. İkinci yöntemde ise lineer bileşimdeki matrisler benzerlik dönüşümü yardımıyla bloklara ayrılır ve problem ilgili matrislere karşılık gelen blok matrisler üzerinden çözülür. İlk yöntem sezgiye dayalı bir yöntemdir. Çünkü lineer bileşimdeki matrislerin sağdan veya soldan çarpılacağı uygun matrisleri bulmak kolay değildir. Dolayısıyla bu yöntemle ilerlemek her zaman kolay olmamaktadır. Bununla birlikte her iki yönteminde sistematik bir yapısının olmayışından ötürü problemler şu ana kadar sadece iki veya üç matris içeren lineer bileşimler için ele alınabilmiştir. Tablo 1.1. ve Tablo 1.2. ye dikkat edilirse, (1.1) lineer bileşiminin birçok farklı özel tipli matris için ele alındığı, ancak (1.2) lineer bileşiminin ise şimdilik sadece idempotent ve tripotent matrisler için çalışıldığı görülmektedir. Dört ve üzeri sayıda matris içeren lineer bileşimleri ele alan bir çalışmaya ise literatürde henüz rastlanılmamaktadır. Bununla birlikte yine Tablo 1.1. ve Tablo 1.2.'den görülmektedir ki problemler ya sadece değişmeli matrisler için ele alınmış, ya da hem değişmeli hem de değişmesiz durum ele alınmış olsa bile değişmeli durumun karakterizasyonu ile ilgili sonuçlar ayrıca verilmiştir. Her iki durumu da ele alan çalışmalar incelendiğinde, elde edilen sonuçların büyük kısmının değişmeli durumun karakterizasyonundan elde edilmiş olduğu görülmektedir.

Özel tipli matrislerin lineer bileşimlerinin yine ne zaman özel tipli matris olacağı problemi, karşılıklı olarak değişmelilik kabulü altında spektrumları belli kümelerin alt kümeleri olan matrislerin lineer bileşimlerinin spektrumunun ne zaman belli bir kümenin alt kümesi olacağı problemine denktir. Örneğin, 2000 yılında Baksalary ve Baksalary [5] tarafından ele alınan iki idempotent matrisin lineer bileşiminin idempotentliği probleminin değişmelilik koşulunu içeren kısmı, $\sigma(X_1)\subseteq\{1,0\}$, $\sigma(X_2)\subseteq\{1,0\}$, ve $X_1X_2 = X_2X_1$ olacak şekilde matrislerin $c_1X_1 + c_2X_2 = X$ biçimli lineer bileşiminin spektrumu $\sigma(X)$, ne zaman $\sigma(X)\subseteq\{1,0\}$ biçiminde olur problemine denktir. Tablo 1.1. ve Tablo 1.2.'de listelenen matrislerin iki ortak özelliği köşegenleştirilebilir olmaları ve spektrumlarının belli kümelerin alt kümeleri olmasıdır.

Kişi ve Özdemir bu problemi en genel haliyle ele aldı ve sonlu sayıda değişmeli köşegenleştirilebilir matrisin lineer bileşiminin spektrumunu belirlemek için bir kombinatorik yöntem geliştirdi [28]. Yöntem, katsayıları lineer bileşimdeki matrislerin spektrumlarından seçilen lineer denklem sistemlerinin çözümüne dayalıdır. Bu geliştirilen yöntem yardımıyla özel tipli matrislerin lineer bileşimlerinin karakterizasyonu problemleri sonlu sayıda matrisin lineer bileşimi için çözülebilmektedir. Ancak lineer bileşimdeki matrislerin sayısı arttıkça çözülmesi gereken lineer denklem sistemlerinin sayısı da üstel olarak arttığından, belli bir noktadan sonra gerekli hesaplamaların sayısı el ile yapılamayacak kadar büyük olmaktadır.

1.3. Ele Alınan Problem

Bu çalışmada [28] de verilen yöntem temel alınarak bir algoritma geliştirildi ve bu algoritmanın *Mathematica* 9.0 paket programındaki uygulama kodları Ek A'da verildi. Böylece özel tipli matrislerin lineer bileşimlerinin karakterizasyonu problemleri bilgisayar vasıtasıyla çözülebilir hale gelmiştir. Ayrıca geliştirilen algoritma yardımıyla aşağıdaki problemler çözüldü. Elde edilen sonuçlardan literatürdeki bir çok sonuç türetilmektedir. Problemler algoritma yardımıyla çözüldüğünden, ispatları program çıktısı olarak (Ek B) verilmektedir. Ele alınan problemler şunlardır:

a. İki değişmeli kübik matrisin lineer bileşiminin kübikliği,
b. İki değişmeli kuadripotent matrisin lineer bileşiminin kuadripotentliği,
c. Karşılıklı değişmeli üç tripotent matrisin lineer bileşiminin tripotentliği,
d. Karşılıklı değişmeli dört involutif matrisin lineer bileşiminin tripotentliği.

İlk problemde elde edilen sonuçlar [15] de tripotent matrisler için ortaya konan sonuçların bir genellemesidir. Kuadripotent matrislerin kümesi genelleştirilmiş ve hipergenelleştirilmiş projektör matrisler kümelerini kapsadığından, ikinci problemde elde edilen sonuçlardan [16], [17], ve [18] çalışmalarında elde edilen sonuçlar üretilebilmektedir. Üçüncü problemde elde edilen sonuçlardan da, [27] ve [28] çalışmalarındaki sonuçlar üretilebilmektedir. Dördüncü problem ise literatürde dört matrisli lineer bileşimin ele alındığı ilk çalışmadır.

BÖLÜM 2. TEMEL KAVRAMLAR VE ÖZELLİKLER

Bu bölümde, içerikte kullanılacak olan birçok temel kavram ve ispatları verilmeksizin teoremler verilecektir.

2.1. Matrisler, Rank ve Lineer Denklem Sistemleri

Tanım 2.1. $a_{ij} \in \mathbb{C},\ i = 1,2,...,m;\ j = 1,2,...,n$, skalerlerinin *m* satır ve *n* sütun olarak

$$A = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{bmatrix}$$

biçimindeki dikdörtgensel düzenlemesine bir $m \times n$ boyutlu matris denir. *A* matrisinin *i*. satır *j*. sütun konumunda bulunan elemanı a_{ij} ile gösterilir [29].

Tanım 2.2. $D \in \mathbb{C}_n$ olsun. $i \neq j$ için $d_{ij} = 0$ ise, *D* matrisine *köşegen matris* denir [29].

Tanım 2.3. $A, B \in \mathbb{C}_n$ olsun. Eğer $AB = BA = I_n$ ise, *B* matrisine *A* matrisinin *tersi* ve *A* matrisine de *tersinirdir* denir ve $B = A^{-1}$ şeklinde gösterilir [29].

Tanım 2.4. $A_i \in \mathbb{C}_{n_i}$, $i = 1,2,...,k$, $\sum_{i=1}^{k} n_i = n$ olmak üzere

$$A = \begin{bmatrix} A_1 & & \mathbf{0} \\ & \ddots & \\ \mathbf{0} & & A_k \end{bmatrix}$$

biçimdeki blok köşegen matrisine A_i, $i = 1, 2, ..., k$, matrislerinin *direkt toplamı* denir ve $A = A_1 \oplus A_2 \oplus \cdots \oplus A_k$ şeklinde gösterilir [29].

Tanım 2.5. $A \in \mathbb{C}_{m\times n}$ olsun. A matrisinin sıfırdan farklı her bir satırının ilk sıfırdan farklı elemanına *baş eleman* denir. Aşağıdaki üç koşulu sağlayan matrise *satır indirgenmiş eşelon biçimdedir* denir:

i. Tüm sıfır satırlar sıfırdan farklı satırların altında yer almaktadır.
ii. Her sıfırdan farklı *i.* satır, $i \leq m-1$, için (*i*+1). satır ya sıfırdır ya da baş elemanının bulunduğu sütun, *i.* satırın baş elemanının bulunduğu sütunun sağında yer almaktadır.
iii. a_{ik}, *i.* satırın baş elemanı ise $a_{ik} = 1$ dir ve *k.* sütunun diğer elemanları sıfırdır [29].

Tanım 2.6. Aşağıdaki işlemlere bir matris üzerindeki *elementer satır işlemleri* denir.

i. Bir satırın bir katını başka bir satıra eklemek.
ii. İki satırın yerlerini değiştirmek.
iii. Bir satırı sıfırdan farklı bir skaler ile çarpmak [29].

Tanım 2.7. Eğer, *A* matrisini *B* matrisine dönüştüren bir dizi elementer satır işlemi var ise *A* matrisi *B* matrisine *satırca denktir* denir [29].

Tanım 2.8. Bir *A* matrisine satırca denk olan satır indirgenmiş eşelon biçimdeki matrise *A*'nın satır indirgenmiş eşelon biçimi denir ve $SİEB(A)$ ile gösterilir [29].

Teorem 2.9. Her matrisin satır indirgenmiş eşelon biçimi vardır ve tektir [29].

Tanım 2.10. Bir A matrisinin satır indirgenmiş eşelon biçimindeki sıfırdan farklı satır sayısına A matrisinin *rankı* denir ve $rk(A)$ ile gösterilir [29].

Teorem 2.11. $\mathbf{a}_1,\ \mathbf{a}_2,\ldots,\ \mathbf{a}_n \in \mathbb{C}^m$ vektörleri $A \in \mathbb{C}_{m\times n}$ matrisinin sütunları olmak üzere A matrisinin satır indirgenmiş eşelon biçimi genelliği bozmaksızın aşağıdaki gibi olsun.

$$\begin{bmatrix} 1 & 0 & \cdots & 0 & b_{1(k+1)} & b_{1(k+2)} & & b_{1n} \\ 0 & 1 & \cdots & 0 & b_{2(k+1)} & b_{2(k+2)} & & b_{2n} \\ & & \ddots & \vdots & \vdots & & \cdots & \\ 0 & 0 & \cdots & 1 & b_{k(k+1)} & b_{k(k+2)} & & b_{kn} \\ 0 & 0 & \cdots & 0 & 0 & 0 & \cdots & 0 \\ & & & & \vdots & & & \\ 0 & 0 & \cdots & 0 & 0 & 0 & \cdots & 0 \end{bmatrix}$$

Bu durumda $\mathbf{a}_{k+1},\ \mathbf{a}_{k+2},\ldots,\ \mathbf{a}_n$ vektörleri $\mathbf{a}_1,\ \mathbf{a}_2,\ldots,\ \mathbf{a}_k$ vektörlerinin lineer bileşimi olarak aşağıdaki şekilde yazılabilir [30]:

$$\begin{aligned} b_{1(k+1)}\mathbf{a}_1 + b_{2(k+1)}\mathbf{a}_2 + \cdots + b_{k(k+1)}\mathbf{a}_k &= \mathbf{a}_{k+1} \\ b_{1(k+2)}\mathbf{a}_1 + b_{2(k+2)}\mathbf{a}_2 + \cdots + b_{k(k+2)}\mathbf{a}_k &= \mathbf{a}_{k+2} \\ &\vdots \\ b_{1n}\mathbf{a}_1 + b_{2n}\mathbf{a}_2 + \cdots + b_{kn}\mathbf{a}_k &= \mathbf{a}_n \end{aligned}$$

Tanım 2.12. $a_1,\ a_2,\ldots,\ a_n,\ b \in \mathbb{C}$ skalerler ve $x_1,\ x_2,\ldots,\ x_n$ bilinmeyenler olmak üzere

$$a_1x_1 + a_2x_2 + \cdots + a_nx_n = b$$

biçimindeki bir eşitliğe *lineer denklem* denir. $a_1,\ a_2,\ldots,\ a_n$ skalerlerine denklemin *katsayıları* ve b skalerine denklemin *sabit terimi* denir. Lineer denklemi sağlayan bir

$\mathbf{s}=\left(s_1,s_2,...,s_n\right)\in\mathbb{C}^n$ vektörüne lineer denklemin bir *çözümü* denir. Bilinmeyenleri aynı olan sonlu tane lineer denklemin

$$\begin{aligned} &a_{11}x_1+a_{12}x_2+\cdots+a_{1n}x_n=b_1\\ &a_{21}x_1+a_{22}x_2+\cdots+a_{2n}x_n=b_2\\ &\qquad\qquad\vdots\\ &a_{m1}x_1+a_{m2}x_2+\cdots+a_{mn}x_n=b_m \end{aligned} \tag{2.1}$$

şeklindeki topluluğuna bir m denklemli n bilinmeyenli *lineer denklem sistemi* veya kısaca *lineer sistem* denir. Bir lineer sistemin her bir denklemini aynı anda sağlayan bir vektöre lineer sistemin bir *çözümü* denir [29].

Tanım 2.13. Bir lineer sistem en az bir çözüme sahip ise *tutarlı* aksi halde *tutarsız* olarak adlandırılır. Çözüm kümeleri aynı olan lineer sistemlere *denk sistemler* denir [29].

Tanım 2.14. (2.1) lineer sistemi $A=\begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n}\\ a_{21} & a_{22} & \cdots & a_{2n}\\ \vdots & \vdots & \vdots & \vdots\\ a_{m1} & a_{m2} & \cdots & a_{mn}\end{bmatrix}$, $\mathbf{x}=\begin{bmatrix} x_1\\ x_2\\ \vdots\\ x_n\end{bmatrix}$ ve $\mathbf{b}=\begin{bmatrix} b_1\\ b_2\\ \vdots\\ b_m\end{bmatrix}$ olmak üzere $A\mathbf{x}=\mathbf{b}$ şeklindeki matris-vektör eşitliği ile ifade edilsin. Burada A'ya katsayılar matrisi, $\mathbf{x}$'e bilinmeyenler vektörü ve $\mathbf{b}$'ye sabitler vektörü (sağ yan vektörü) denir. $\left[\begin{array}{cccc|c} a_{11} & a_{12} & \cdots & a_{1n} & b_1\\ a_{21} & a_{22} & \cdots & a_{2n} & b_2\\ \vdots & \vdots & \vdots & \vdots & \vdots\\ a_{m1} & a_{m2} & \cdots & a_{mn} & b_m\end{array}\right]$ matrisine ise (2.1) lineer sisteminin *ekli matrisi* denir ve $\left[A \mid \mathbf{b}\right]$ ile gösterilir [29].

Teorem 2.15. $\left[C \mid \mathbf{d}\right]$ ekli matrisi $\left[A \mid \mathbf{b}\right]$ ekli matrisinden bir dizi elementer satır işlemleri uygulanmasıyla elde edilmiş olsun. Bu durumda $A\mathbf{x}=\mathbf{b}$ ve $C\mathbf{x}=\mathbf{d}$ lineer sistemleri denk sistemlerdir [29].

Teorem 2.16. $A\mathbf{x}=\mathbf{b}$ lineer sisteminin katsayılar matrisi A, $m\times n$ boyutlu, $rk(A)=p$ ve $rk([\mathrm{A} \mid \mathbf{b}])=q$ olsun. Bu durumda;

i. $p<q$ ise sistemin çözümü yoktur,
ii. $p=q=n$ ise sistemin tek çözümü vardır,
iii. $p=q<n$ ise sistemin sonsuz çoklukta çözümü vardır [30].

Tanım 2.17. $A\mathbf{x}=\mathbf{b}$ lineer sisteminin katsayılar matrisi A, $m\times n$ boyutlu olsun. $A\mathbf{x}=\mathbf{b}$ lineer sistemine;

i. $m<n$ ise *eksik*,
ii. $m=n$ ise *kare*,
iii. $m>n$ ise *aşkın* lineer sistem denir [31].

Teorem 2.18. $A\mathbf{x}=\mathbf{b}$ lineer sistemi eksik bir sistem ise, bu durumda ya tutarsızdır ya da sonsuz çoklukta çözümü vardır [31].

Teorem 2.19. $A\mathbf{x}=\mathbf{b}$ lineer sistemi aşkın bir sistem ise, bu durumda en az bir $\mathbf{b}\in\mathbb{C}^n$ için tutarsızdır [31].

Literatürde, A, B ve C matrisleri sırasıyla $m\times n$, $p\times q$ ve $m\times q$ boyutlu bilinenler matrisleri ve X bir $n\times p$ boyutlu bilinmeyenler matrisi olmak üzere $AXB=C$ şeklindeki denkleme, bir *lineer matris denklemi* denilmektedir. $p=q$ ve $B=I_p$ olması durumunda da, yani $AX=C$ denklemine de, *katlı sağ yanlı lineer denklem sistemi* denilmektedir.

Lineer sistemlerinin çözümü ve aşkın lineer sistemin tanımı göz önüne alındığında aşağıdaki sonuç hemen görülür.

Sonuç 2.20. $AX = B$ bir katlı sağ yanlı aşkın lineer sistem olsun. Bu durumda $AX = B$ lineer sisteminin çözüm kümesi, onun tüm alt kare lineer sistemlerinin çözüm kümelerinin kesişimidir.

2.2. Matrislerin Köşegenleştirilmesi

Tanım 2.21. $A \in \mathbb{C}_n$ olsun. Eğer bir $\lambda \in \mathbb{C}$ skaleri ve sıfırdan farklı $\mathbf{x} \in \mathbb{C}^n$ vektörü

$$A\mathbf{x} = \lambda \mathbf{x}$$

denklemini sağlıyorsa λ skalerine A matrisinin bir *özdeğeri* ve $\mathbf{x}$ vektörüne de A matrisinin λ özdeğeri ile ilişkili bir *özvektörü* denir [32].

Tanım 2.22. Bir $A \in \mathbb{C}_n$ matrisinin tüm özdeğerlerinin kümesine A matrisinin *spektrumu* denir ve $\sigma(A)$ ile gösterilir [32].

Tanım 2.23. Bir $A \in \mathbb{C}_n$ matrisinin *karakteristik polinomu* $p_A(t) = \det(tI - A)$ olarak tanımlanır. $p_A(t) = 0$ denklemine $A \in \mathbb{C}_n$ matrisinin *karakteristik denklemi* denir [32].

Teorem 2.24. $A \in \mathbb{C}_n$ ve $p_A(t)$ A matrisinin karakteristik denklemi olsun. Eğer $p_A(\lambda) = 0$ ise λ A matrisinin bir özdeğeridir [32].

Teorem 2.25. $A \in \mathbb{C}_n$ olsun. A matrisi, polinomda yazıldığında sıfıra eşit olan minumum dereceli bir $q_A(t)$ monik (en yüksek dereceli teriminin katsayısı 1 olan) polinomu vardır. Bu polinomun derecesi en fazla n olabilir. Eğer $p(t)$, $p(A) = \mathbf{0}$ olacak şekildeki herhangi bir polinom ise, $q_A(t)$ polinomu $p(t)$ polinomunu böler [32].

Tanım 2.26. $A \in \mathbb{C}_n$ olsun. A matrisi, polinomda yazıldığında sıfıra eşit olan minumum dereceli $q_A(t)$ monik polinomuna A matrisinin *minimal polinomu* denir [32].

Tanım 2.27. $A, B \in \mathbb{C}_n$ olsun. Eğer $A = S^{-1}BS$ olacak biçimde bir $S \in \mathbb{C}_n$ tersinir matrisi var ise, *A matrisi B matrisine benzerdir* denir [32].

Tanım 2.28. Bir $A \in \mathbb{C}_n$ matrisi bir köşegen matrise benzer ise, A matrisine *köşegenleştirilebilirdir* denir [32].

Teorem 2.29. $A \in \mathbb{C}_n$ olmak üzere $q_A(t)$; A matrisinin minimal polinomu olsun. Bu durumda aşağıdaki önermeler denktir:

i. $q_A(t)$ polinomu farklı lineer çarpanların çarpımıdır.
ii. A matrisinin her bir özdeğeri $q_A(t) = 0$ denkleminin bir tek katlı köküdür.
iii. A matrisi köşegenleştirilebilirdir [32].

Tanım 2.30. $A, B \in \mathbb{C}_n$ olsun. Eğer $S^{-1}AS$ ve $S^{-1}BS$ matrislerinin ikisi de köşegen olacak şekilde bir $S \in \mathbb{C}_n$ tersinir matrisi var ise, A ve B matrislerine *eşzamanlı köşegenleştirilebilirdir* denir [32].

Teorem 2.31. $A, B \in \mathbb{C}_n$ matrisleri köşegenleştirilebilir olsun. A ve B matrislerinin eşzamanlı köşegenleştirilebilir olmasının gerekli ve yeterli koşulu A ve B matrislerinin değişmeli, yani $AB = BA$, olmasıdır [32].

Tanım 2.30 dikkate alındığında aşağıdaki sonuç hemen elde edilir.

Sonuç 2.32. $A, B \in \mathbb{C}_n$ matrisleri eşzamanlı köşegenleştirilebilir matrisler, $c_1, c_2 \in \mathbb{C} \setminus \{0\}$ ve $c_1 A + c_2 B = C$ olsun. Bu durumda C lineer bileşim matrisi de A ve B matrisleri ile eşzamanlı köşegenleştirilebilirdir.

2.3. Bazı Özel Tipli Matrisler ve Bu Matrislerin Bazı Özellikleri

Tanım 2.33. $A \in \mathbb{C}_n$ olmak üzere $rk\left(A^k\right) = rk\left(A^{k+1}\right)$ olacak biçimdeki en küçük k pozitif tam sayısına A matrisinin *indisi* denir ve $ind\left(A\right)$ ile gösterilir [33].

Tanım 2.34. $A \in \mathbb{C}_n$ olmak üzere

$$AXA = A \tag{2.2}$$
$$XAX = X \tag{2.3}$$
$$\left(AX\right)^* = AX \tag{2.4}$$
$$\left(XA\right)^* = XA \tag{2.5}$$
$$AX = XA \tag{2.6}$$
$$A^k = XA^{k+1},\ k = ind\left(A\right) \tag{2.7}$$

eşitliklerinden (2.2), (2.3), (2.4), ve (2.5)'i sağlayan tek bir X matrisi vardır, buna A matrisinin *Moore-Penrose* tersi denir ve $A^\dagger$ ile gösterilir. (2.2), (2.3), ve (2.6) eşitliklerini sağlayan bir X matrisi varsa bu matris tektir, buna A matrisinin *grup* tersi denir ve $A^\#$ ile gösterilir. (2.3), (2.6), ve (2.7) eşitliklerini sağlayan bir X matrisi varsa bu matris tektir, buna A matrisinin *Drazin* tersi denir ve A^D ile gösterilir (Grup ters, Drazin tersin $k = 1$ özel halidir) [33].

Teorem 2.35. Bir $A \in \mathbb{C}_n$ matrisinin Grup terse sahip olmasının gerekli ve yeterli koşulu $rk(A) = rk(A^2)$ olmasıdır [33].

Tanım 2.36. Bir $A \in \mathbb{C}_n$ matrisi $AA^* = A^*A$ özelliğini sağlıyor ise A matrisine *normal* matris denir [29].

Teorem 2.37. $A \in \mathbb{C}_n$ bir normal matris ise A matrisi köşegenleştirilebilirdir [29].

Tanım 2.38. Bir $A \in \mathbb{C}_n$ matrisi $AA^{\dagger} = A^{\dagger}A$ özelliğini sağlıyor ise A matrisine *EP matris* denir [34].

Tanım 2.39. Bir $A \in \mathbb{C}_n$ matrisi $A^k = A$, $k = 2,3,\ldots$, özelliğini sağlıyor ise, A matrisine *k-potent* denir. $k = 2$, $k = 3$ ve $k = 4$ olması özel durumlarında A matrisine, sırasıyla, *idempotent*, *tripotent* ve *kuadripotent* matris denir [35].

Teorem 2.40. $A \in \mathbb{C}_n$ bir k-potent matris ve $\Omega_k = \left\{ a \mid a^k = 1, a \in \mathbb{C} \right\}$ olsun. Bu durumda, A matrisi köşegenleştirilebilirdir ve $\sigma(A) \subseteq \Omega_k \cup \{0\}$ dır. Özel olarak , $k = 2$ için $\sigma(A) \subseteq \Omega_2 = \{1, 0\}$, $k = 3$ için $\sigma(A) \subseteq \Omega_3 = \{1, -1, 0\}$, ve $k = 4$ için $\sigma(A) \subseteq \Omega_4 = \left\{ -\frac{1}{2} + \frac{\sqrt{3}i}{2}, -\frac{1}{2} - \frac{\sqrt{3}i}{2}, 1, 0 \right\}$ dır [35].

Tanım 2.41. Bir $A \in \mathbb{C}_n$ matrisi $A = A^{-1}$ özelliğini $\left(A^2 = I_n \right)$ sağlıyor ise, A matrisine *involutif* matris denir [33].

Teorem 2.42. $A \in \mathbb{C}_n$ bir involutif matris olsun. Bu durumda A matrisi köşegenleştirilebilirdir ve $\sigma(A) \subseteq \{1, -1\}$ dır [33].

Tanım 2.43. Bir $A \in \mathbb{C}_n$ matrisi $A = A^{\#}$ özelliğini sağlıyor ise, A matrisine *grup involutif* matris denir [33].

Teorem 2.44. Bir $A \in \mathbb{C}_n$ matrisi için $A = A^{\#}$ olmasının gerekli ve yeterli koşulu $A^3 = A$ olmasıdır [33].

Tanım 2.45. Bir $A \in \mathbb{C}_n$ matrisi $A = A^{\dagger}$ özelliğini sağlıyor ise, A matrisine *genelleştirilmiş involutif* matris denir [14].

Teorem 2.46. Bir $A \in \mathbb{C}_n$ matrisi için $A = A^{\dagger}$ olmasının gerekli ve yeterli koşulu $A^3 = A$ olmasıdır [14].

Tanım 2.47. Bir $A \in \mathbb{C}_n$ matrisine $A^2 = A^*$ özelliğini sağlıyor ise *genelleştirilmiş projektör*, $A^2 = A^{\dagger}$ özelliğini sağlıyor ise *hipergenelleştirilmiş projektör* denir [34].

Teorem 2.48. Bir $A \in \mathbb{C}_n$ matrisi için $A^2 = A^*$ olmasının gerekli ve yeterli koşulu $A^4 = A$ ve $AA^* = A^*A$ olmasıdır [34].

Teorem 2.49. Bir $A \in \mathbb{C}_n$ matrisi için $A^2 = A^{\dagger}$ olmasının gerekli ve yeterli koşulu $A^4 = A$ ve $AA^{\dagger} = A^{\dagger}A$ olmasıdır [34].

Tanım 2.50. Bir $A \in \mathbb{C}_n$ matrisine $A^k = A^*$, $k \in \mathbb{N}$ ve $k \geq 2$, özelliğini sağlıyor ise *k-genelleştirilmiş projektör* denir [17].

Teorem 2.51. $A \in \mathbb{C}_n$ olsun. Bu durumda aşağıdakiler denktir.

i. A matrisi k-genelleştirilmiş projektördür.
ii. $AA^* = A^*A$ ve $\sigma(A) \subseteq \Omega_{k+1} \cup \{0\}$ dir.
iii. $AA^* = A^*A$ ve $A^{k+2} = A$ dır [17].

Sonuç 2.52. Bir $A \in \mathbb{C}_n$ matrisi k-genelleştirilmiş projektör ise, bu durumda $A^{\dagger} = A^{\#} = A^D = A^* = A^{m(k+1)+k}, m \in \mathbb{N}$ dır [17].

Tanım 2.53. Bir $A \in \mathbb{C}_n$ matrisine $A^k = A^{\dagger}$, $k \in \mathbb{N}$ ve $k \geq 2$, özelliğini sağlıyor ise *k-hipergenelleştirilmiş projektör* denir [36].

Teorem 2.54. Bir $A \in \mathbb{C}_n$ matrisinin k-hipergenelleştirilmiş projektör olmasının gerekli ve yeterli koşulu $AA^{\dagger} = A^{\dagger}A$ ve $A^{k+2} = A$ olmasıdır [36].

Sonuç 2.55. *k*-genelleştirilmiş projektörlerin kümesi *k*-hipergenelleştirilmiş projektörlerin kümesinin alt kümesidir. *k*-hipergenelleştirilmiş projektörlerin kümesi de (*k*+2)-potent matrislerin kümesinin alt kümesidir [36].

Tanım 2.56. Bir $A \in \mathbb{C}_n$ matrisine $A^{k-1} = A^{\#}$, $k \in \mathbb{N}$ ve $k \geq 2$, özelliğini sağlıyor ise $\{k\}$-*grup periyodik* denir [20].

Teorem 2.57. Bir $A \in \mathbb{C}_n$ matrisinin $\{k\}$-grup periyodik olmasının gerekli ve yeterli koşulu $A^{k+1} = A$ olmasıdır [20].

Tanım 2.58. $A, K \in \mathbb{C}_n$ ve $K^2 = I_n$ olmak üzere $KA^{s+1}K = A$, $s \in \mathbb{N}$, özelliğini sağlayan A matrisine $\{K,s+1\}$-*potent* matris denir [21].

Teorem 2.59. $A \in \mathbb{C}_n$ bir $\{K,s+1\}$-potent matris olsun. Bu durumda A matrisi köşegenleştirilebilirdir ve $\sigma(A) \subseteq \Omega_{(s+1)^2-1} \cup \{0\}$ dır [21].

Tanım 2.60. $A \in \mathbb{C}_n$ ve $\alpha, \beta \in \mathbb{C}$ olmak üzere $(A - \alpha I_n)(A - \beta I_n) = \mathbf{0}$ özelliğini sağlayan A matrisine $\{\alpha, \beta\}$-*kuadratik* matris denir [37].

Teorem 2.61. $A \in \mathbb{C}_n$ bir $\{\alpha, \beta\}$-kuadratik matris olsun. Bu durumda A matrisi köşegenleştirilebilirdir ve $\sigma(A) \subseteq \{\alpha, \beta\}$ dır [37].

Tanım 2.62. $A, P \in \mathbb{C}_n$, $\alpha, \beta \in \mathbb{C}$ ve $P^2 = P$ olmak üzere $(A - \alpha P)(A - \beta P) = \mathbf{0}$ özelliğini sağlayan A matrisine $\{\alpha, \beta\}$- *genelleştirilmiş kuadratik* matris denir [23].

Teorem 2.63. $A \in \mathbb{C}_n$ bir $\{\alpha, \beta\}$- genelleştirilmiş kuadratik matris olsun. Bu durumda A matrisi köşegenleştirilebilirdir ve $\sigma(A) \subseteq \{\alpha, \beta, 0\}$ dır [23].

Tanım 2.64. $A \in \mathbb{C}_n$ ve $\alpha, \beta, \gamma \in \mathbb{C}$ olmak üzere $(A - \alpha I_n)(A - \beta I_n)(A - \gamma I_n) = \mathbf{0}$ özelliğini sağlayan A matrisine $\{\alpha, \beta, \gamma\}$ -*kübik* matris denir.

Teorem 2.65. $A \in \mathbb{C}_n$ bir $\{\alpha, \beta, \gamma\}$-kübik matris olsun. Bu durumda A matrisi köşegenleştirilebilirdir ve $\sigma(A) \subseteq \{\alpha, \beta, \gamma\}$ dır.

İdempotent matrislerin $\{1, 0\}$-kuadratik, involutif matrislerin $\{1, -1\}$-kuadratik, ve tripotent matrislerin de $\{1, -1, 0\}$-kübik matrisler olduğu açıktır. Dolayısıyla $\{\alpha, \beta\}$-kuadratik matrislerin kümesi idempotent ve involutif matrislerin kümesini ve $\{\alpha, \beta, \gamma\}$-kübik matrislerin kümesi de tripotent matrislerin kümesini kapsamaktadır.

BÖLÜM 3. SONLU SAYIDA DEĞİŞMELİ KÖŞEGENLEŞTİRİLEBİLİR MATRİSİN LİNEER BİLEŞİMİNİN SPEKTRUMUNUN KARAKTERİZE EDİLMESİ

3.1. Giriş

Bu bölümde önce Kişi ve Özdemir tarafından sonlu sayıda değişmeli köşegenleştirilebilir matrisin lineer bileşiminin spektrumunu karakterize etmek için [28] de verilen kombinatorik yöntem açıklanacak ve akabinde bu yöntem temel alınarak geliştirilen algoritma verilecektir.

3.2. Sonlu Sayıda Değişmeli Köşegenleştirilebilir Matrisin Lineer Bileşiminin Spektrumunu Karakterize Etmek İçin Bir Kombinatorik Yöntem

$X_i \in \mathbb{C}_n$, $1 \le i \le m$, matrisleri $\sigma(X_i) \subseteq \left\{\lambda_1^{(i)}, \ldots, \lambda_{n_i}^{(i)}\right\}$, $n_i \le n$, olacak biçimde değişmeli köşegenleştirilebilir matrisler ve $c_i \in \mathbb{C} \setminus \{0\}$, $1 \le i \le m$, olsun. Ele alınan problem X_i matrislerinin

$$c_1 X_1 + c_2 X_2 + \cdots + c_m X_m = X \tag{3.1}$$

lineer bileşiminin $\sigma(X) \subseteq \left\{\lambda_1, \ldots, \lambda_{n_x}\right\}$, $n_x \le n$, olacak biçimde bir X matrisi olduğu durumları karakterize etmektir. X_i matrisleri köşegenleştirilebilir ve değişmeli olduklarından, Teorem 2.31'a göre eşzamanlı köşegenleştirilebilir matrislerdir. Bu durumda, Λ_i, $1 \le i \le m$, matrisleri X_i, $1 \le i \le m$, matrislerine karşılık gelen köşegen matrisler ve Λ matrisi X matrisine karşılık gelen köşegen matris olmak üzere, Sonuç 2.32'e göre

$$\begin{aligned} c_1 S^{-1} X_1 S + c_2 S^{-1} X_2 S + \cdots + c_m S^{-1} X_m S &= S^{-1} X S \\ c_1 \Lambda_1 + c_2 \Lambda_2 + \cdots + c_m \Lambda_m &= \Lambda \end{aligned} \tag{3.2}$$

olacak şekilde bir S tersinir matrisi vardır. (3.2) lineer bileşiminin açık biçimi, genelliği bozmaksızın

$$c_1 \begin{bmatrix} \lambda_1^{(1)} & & & \mathbf{0} \\ & \lambda_2^{(1)} & & \\ & & \ddots & \\ \mathbf{0} & & & \lambda_{n_1}^{(1)} \end{bmatrix} + c_2 \begin{bmatrix} \lambda_1^{(2)} & & & \mathbf{0} \\ & \lambda_2^{(2)} & & \\ & & \ddots & \\ \mathbf{0} & & & \lambda_{n_2}^{(2)} \end{bmatrix} + \cdots + c_m \begin{bmatrix} \lambda_1^{(m)} & & & \mathbf{0} \\ & \lambda_2^{(m)} & & \\ & & \ddots & \\ \mathbf{0} & & & \lambda_{n_m}^{(m)} \end{bmatrix} = \begin{bmatrix} \lambda_1 & & & \mathbf{0} \\ & \lambda_2 & & \\ & & \ddots & \\ \mathbf{0} & & & \lambda_{n_x} \end{bmatrix} \tag{3.3}$$

şeklindedir. (3.3) denkleminden görüldüğü üzere (3.1) lineer bileşiminin karakterizasyonu, bilinmeyenleri c_i, $1 \le i \le m$, skalerleri olan lineer sistemlerin çözümünlerine dayalıdır. Bunun için önce tüm olası lineer denklem sol yanları belirlenmeli, bununla birlikte tüm olası sabit terimlerin içerildiği katlı sağ yanlar oluşturulmalı ve sonrasında bu lineer denklem sol yanları vasıtasıyla tüm olası lineer sistem sol yanları oluşturulup uygun boyutlu katlı sağ yanlarının eklenmesiyle meydana gelen lineer sistemler çözülmelidir.

(3.3) denkleminden görüldüğü üzere c_i, $1 \le i \le m$, bilinmeyenlerinin katsayıları karşılık gelen $\sigma(X_i)$, $1 \le i \le m$, kümelerinden gelmektedir. Dolayısıyla her c_i bilinmeyeni için n_i farklı katsayı vardır. Böylece çarpım kuralından $n_1 n_2 \cdots n_m$ farklı lineer denklem sol yanı elde edilir. Lineer sistemlerin sol yanları bu $n_1 n_2 \cdots n_m$ farklı lineer denklem sol yanlarının, önce birli, sonra ikili ve böyle devam ederek en son m'li kombinasyonlarının ele alınmasıyla oluşturulur. Lineer sistemlerin sağ yanları ise sabit terimleri $\sigma(X)$ kümesinden seçilen ve tüm olası sabit terimlerin içerildiği uygun boyutlu katlı sağ yanlardır. Bir denklemli sistemlerin katlı sağ yanı $1\times n_x$ boyutlu, iki denklemli sistemlerin katlı sağ yanı $2\times n_x^2$ boyutlu ve böyle devam ederek en son *m* denklemli sistemlerin katlı sağ yanı $m\times n_x^m$ boyutlu matrislerdir.

Lineer sistemlerin oluşturulma sürecinde sadece eksik ve kare lineer sistemler ele alınmalıdır. Çünkü Sonuç 2.20'den bilindiği üzere bir katlı sağ yanlı aşkın lineer sistemin çözümleri bu lineer sistemin tüm alt kare lineer sistemlerinin çözümlerinin kesişimidir. Tüm olası kare lineer sistemlerin çözümleri elde edilmiş olduğundan, aşkın lineer sistemlerin çözümleri bu mevcut çözümlerin kesişimi olacaktır. Bu nedenle aşkın lineer sistemleri ele almak yeni sonuçlar ortaya koymayacaktır. Dolayısıyla (3.1) lineer bileşiminin karakterizasyonunu elde etmek için $\binom{n_1n_2\cdots n_m}{1}+\binom{n_1n_2\cdots n_m}{2}+\cdots+\binom{n_1n_2\cdots n_m}{m}$ sayıda lineer sistemi çözmek yeterlidir. Bu yöntemin avantajlarından biri de daha lineer bileşimin karakterizasyonuna başlamadan önce elde edilecek olan sonuç sayısı için bir üst sınırın belli olmasıdır.

Örneğin, $\sigma(X_1)\subseteq\{\lambda_1^{(1)},\lambda_2^{(1)},\lambda_3^{(1)}\}$, $\sigma(X_2)\subseteq\{\lambda_1^{(2)},\lambda_2^{(2)}\}$, $\sigma(X_3)\subseteq\{\lambda_1^{(3)},\lambda_2^{(3)},\lambda_3^{(3)},\lambda_4^{(3)}\}$ ve $\sigma(X_4)\subseteq\{\lambda_1^{(4)},\lambda_2^{(4)},\lambda_3^{(4)}\}$ olacak biçimdeki X_i, $1\le i\le 4$, matrislerinin $c_1X_1+c_2X_2+c_3X_3+c_4X_4=X$ şeklindeki lineer bileşiminin spektrumu ne zaman $\sigma(X)\subseteq\{\lambda_1,\lambda_2,\lambda_3\}$ şeklinde olur problemini ele alalım. Yukarıda verilen yöntem ışığında, önce $3\cdot2\cdot4\cdot3=72$ farklı lineer denklem sol yanı oluşturulmalıdır. Sonra bu lineer denklem sol yanları ile $\binom{72}{1}+\binom{72}{2}+\binom{72}{3}+\binom{72}{4}=1091058$ farklı lineer sistem sol yanları ve 1×3, 2×9, 3×27 ve 4×81 boyutlu katlı sağ yanlar oluşturulmalıdır. Sonra lineer sistem sol yanları, uygun boyutlu katlı sağ yanlar ile bir araya getirilerek tüm olası lineer sistemler oluşturulup çözülmelidir. Örneğin, bu oluşturulan lineer sistemlerden biri aşağıdaki gibidir.

$$\begin{bmatrix} \lambda_2^{(1)} & \lambda_1^{(2)} & \lambda_1^{(3)} & \lambda_1^{(4)} \\ \lambda_2^{(1)} & \lambda_2^{(2)} & \lambda_3^{(3)} & \lambda_2^{(4)} \\ \lambda_3^{(1)} & \lambda_2^{(2)} & \lambda_4^{(3)} & \lambda_3^{(4)} \end{bmatrix} \begin{bmatrix} c_1 \\ c_2 \\ c_3 \\ c_4 \end{bmatrix} = \begin{bmatrix} \lambda_1 & \lambda_1 & & \lambda_3 & \lambda_3 \\ \lambda_1 & \lambda_1 & \cdots & \lambda_3 & \lambda_3 \\ \lambda_1 & \lambda_2 & & \lambda_2 & \lambda_3 \end{bmatrix}_{3\times 27} \tag{3.4}$$

Her bir lineer sisteme karşılık gelen Λ_i, $1 \le i \le m$, matrisleri olduğu unutulmamalıdır. Örneğin, (3.4) lineer sistemine karşılık gelen Λ_i, $1 \le i \le 4$, matrisleri $r_1 + r_2 + r_3 = n$ olmak üzere,

$$\Lambda_1 = \lambda_2^{(1)} I_{r_1} \oplus \lambda_2^{(1)} I_{r_2} \oplus \lambda_3^{(1)} I_{r_3},\ \Lambda_2 = \lambda_1^{(2)} I_{r_1} \oplus \lambda_2^{(2)} I_{r_2} \oplus \lambda_2^{(2)} I_{r_3},$$
$$\Lambda_3 = \lambda_1^{(3)} I_{r_1} \oplus \lambda_3^{(3)} I_{r_2} \oplus \lambda_4^{(3)} I_{r_3},\ \Lambda_4 = \lambda_1^{(4)} I_{r_1} \oplus \lambda_2^{(4)} I_{r_2} \oplus \lambda_3^{(4)} I_{r_3}$$

biçimindedir.

Lineer bileşimin karakterizasyonu c_i skalerleri ve X_i matrisleri üzerindeki şartlar belirlenerek elde edilmektedir. Lineer sistemlerin çözümleri, lineer bileşimin karakterizasyonunda ilk aşamada c_i, $1 \le i \le m$, skalerleri ile ilgili şartları ortaya koymaktadır. X_i, $1 \le i \le m$, matrisleri ile ilgili sağlanması gereken şartlar için ise iki farklı durum vardır (Tutarsız lineer sistemlerden bir sonuç elde edilmeyeceğinden bu durum hariç tutulmuştur).

Sonsuz çözüme sahip lineer sistemlerde X_i, $1 \le i \le m$, matrisleri ile ilgili şartlar Teorem 2.11 yardımıyla elde edilir. Örneğin, (3.4) lineer sisteminin katsayılar matrisinin satır indirgenmiş eşelon biçimi aşağıdaki gibi olsun.

$$\begin{bmatrix} 1 & 0 & 0 & \alpha \\ 0 & 1 & 0 & \beta \\ 0 & 0 & 1 & \gamma \end{bmatrix}$$

Bu durumda, bu sonucun matrisler ile ilgili şartı $\alpha X_1 + \beta X_2 + \gamma X_3 = X_4$ şeklindedir.

Tek çözüme sahip lineer sistemlerde ise ele alınan problemdeki matrislerin tipine göre iki farklı durum vardır. Ele alınan problem *k*-potent matrislerin lineer bileşiminin *k*-potentliği şeklinde ise, bu durumda önce problemin şartı lineer bileşime uygulanarak matrisler için genel bir eşitlik elde edilir. Sonrasında ise tek çözüme sahip bir lineer sistemin ilk sıfır içermeyen çözümü (katlı sağ yanlı lineer sisteme karşılık gelen lineer denklemlerin, sıfır bileşeni içermeyen çözüme sahip ilk lineer denklemin çözümü), eğer bu çözüm daha önce kullanıldıysa aynı özellikli bir sonraki ilk çözümü, ve benzer şekilde devam edilerek elde edilen genel matris eşitliğinde yerine yazılmasıyla bu lineer sisteme karşılık gelen matris şartı belirlenir. Ele alınan problem *k*-potent olmayan ve spektrumları belli kümelerin alt kümesi olacak biçimdeki matrislerin lineer bileşiminin karakterizasyonu ise, örneğin kuadratik matrislerin lineer bileşiminin kuadratikliği veya kübik matrislerin lineer bileşiminin kübikliği şeklinde ise, bu durumda lineer bileşime uygulanabilecek bir problem şartı olmadığından lineer sistemlerin çözüm kümelerinin yanına matris şartı olarak bu lineer sisteme karşılık gelen Λ_i, $1 \le i \le m$, köşegen matrisleri yazılır.

Eğer, (3.1) lineer bileşiminin karakterizasyonu lineer bağımsız X_i, $1 \le i \le m$, matrisleri için, yani herhangi bir X_i matrisinin diğerlerinin lineer bileşimi şeklinde yazılamadığı X_i, $1 \le i \le m$, matrisleri için isteniyorsa, bu durumda lineer sistemleri oluşturma sürecinde eksik lineer sistem sol yanları dikkate alınmamalı sadece kare lineer sistem sol yanları ele alınmalıdır. Böylece çözülmesi gereken lineer sistem sayısı da $\binom{n_1 n_2 \cdots n_m}{m}$ sayısına iner.

3.2.1. $\sigma(X_i)$, $1 \le i \le m$, Spektrumlarının Bazı Özel Durumlarının Lineer Sistemler ve Onların Çözümleri Üzerindeki Etkisi

Eğer, bazı $\sigma(X_i)$, $1 \le i \le m$, spektrumları için $0 \in \sigma(X_i)$ ise, bu durumda bazı sütunları sıfır olan lineer sistem sol yanları meydana gelmektedir. Bu sıfır sütunlarına karşılık gelen matrisler sıfır matrisi olduğundan, bu şekildeki lineer sistem sol yanları ele alınmayacaktır. Eğer, tüm $\sigma(X_i)$, $1 \le i \le m$, spektrumları için $0 \in \sigma(X_i)$ ise, bu durumda

$$0c_1 + 0c_2 + \cdots + 0c_m \tag{3.5}$$

şeklinde bir lineer denklem sol yanı meydana gelecektir. Lineer sistemlerin oluşturulma sürecinde bu lineer denklem sol yanının ele alınmasının anlamsız olduğu açıktır. Böylece çözülmesi gereken lineer sistem sayısı $\binom{n_1 n_2 \cdots n_m - 1}{1} + \binom{n_1 n_2 \cdots n_m - 1}{2} + \cdots + \binom{n_1 n_2 \cdots n_m - 1}{m}$ olur. Her ne kadar (3.5) lineer denklem sol yanı ele alınmıyor olsa bile, eğer bu lineer denklem sol yanına karşılık gelen blokların, oluşturulmuş olan lineer sistemlerin karşılık gelen Λ_i, $1 \le i \le m$, köşegen matrislerinde içerildiği kabul edilirse sonuçlar daha genel matrisler için elde edilir. Örneğin, böyle bir durumda, bu kabul altında (3.4) lineer sistemine karşılık gelen Λ_i, $1 \le i \le 4$, köşegen matrisleri $\sum_{i=1}^{4} r_i = n$ olmak üzere

$$\Lambda_1 = \lambda_2^{(1)} I_{r_1} \oplus \lambda_2^{(1)} I_{r_2} \oplus \lambda_3^{(1)} I_{r_3} \oplus \mathbf{0} I_{r_4}, \ \Lambda_2 = \lambda_1^{(2)} I_{r_1} \oplus \lambda_2^{(2)} I_{r_2} \oplus \lambda_2^{(2)} I_{r_3} \oplus \mathbf{0} I_{r_4},$$
$$\Lambda_3 = \lambda_1^{(3)} I_{r_1} \oplus \lambda_3^{(3)} I_{r_2} \oplus \lambda_4^{(3)} I_{r_3} \oplus \mathbf{0} I_{r_4} \text{ ve } \Lambda_4 = \lambda_1^{(4)} I_{r_1} \oplus \lambda_2^{(4)} I_{r_2} \oplus \lambda_3^{(4)} I_{r_3} \oplus \mathbf{0} I_{r_4}$$

şeklinde olur.

Eğer, $\sigma(X_i)$, $1 \le i \le m$, spektrumlarının bir kısmı veya tümü, bazı özdeğerlerin ters işaretlilerini de özdeğer olarak içeriyorsa yani, örneğin, $\lambda_1^1 \in \sigma(X_1)$ iken $-\lambda_1^1 \in \sigma(X_1)$ ise, bu durumda çözümleri birbirinin ters işaretlisi olan lineer sistemler meydana gelmektedir. Örneğin, böyle bir durumda $\{(\alpha_1, \alpha_2, \ldots, \alpha_m), (\beta_1, \beta_2, \ldots, \beta_m)\}$ kümesi bir lineer sistemin çözüm kümesi iken $\{(-\alpha_1, \alpha_2, \ldots, \alpha_m), (-\beta_1, \beta_2, \ldots, \beta_m)\}$, $\{(\alpha_1, \alpha_2, \ldots, -\alpha_m), (\beta_1, \beta_2, \ldots, -\beta_m)\}$ veya $\{(-\alpha_1, -\alpha_2, \ldots, \alpha_m), (-\beta_1, -\beta_2, \ldots, \beta_m)\}$ şeklindeki kümeler başka lineer sistemlerin çözüm kümeleri olarak karşımıza çıkmaktadır. Dikkat edilirse çözüm kümelerindeki çözümlerin hepsinin aynı bileşeni ters işaretli olmaktadır, yani birinci çözüm kümesi için birinci bileşen, ikinci çözüm kümesi için *m*-inci bileşen ve üçüncü çözüm kümesi için birinci ve ikinci bileşen ters işaretlidir.

Eğer tüm $\sigma(X_i)$, $1 \le i \le m$, spektrumları ve $\sigma(X)$ spektrumu tüm özdeğerlerini ters işaretlileri ile birlikte içeriyorsa, bu durumda birbirinin ters işaretlisi olan lineer denklemler ortaya çıkmaktadır. Bu, birbirinin ters işaretlisi olan lineer denklemler aynı lineer sistemin içinde yer aldıklarında bu iki lineer denklemden biri lineer sistemin çözümü sürecinde elenecektir. Örneğin,

$$\begin{bmatrix} 1 & 1 & -1 \\ -1 & -1 & 1 \\ 1 & -1 & 0 \end{bmatrix} \begin{bmatrix} c_1 \\ c_2 \\ c_3 \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 & 1 & -1 & -1 & -1 & -1 \\ 1 & 1 & -1 & -1 & 1 & 1 & -1 & -1 \\ 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 \end{bmatrix} \tag{3.6}$$

lineer sistemini ele alalım. Katsayılar matrisinin ilk satırı ikinci satıra eklenirse ve aynı işlem lineer sistemin sağ yanı içinde yapılırsa,

$$\begin{bmatrix} 1 & 1 & -1 \\ 0 & 0 & 0 \\ 1 & -1 & 0 \end{bmatrix} \begin{bmatrix} c_1 \\ c_2 \\ c_3 \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 & 1 & -1 & -1 & -1 & -1 \\ 2 & 2 & 0 & 0 & 0 & 0 & -2 & -2 \\ 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 \end{bmatrix}$$

lineer sistemi elde edilir. Katsayılar matrisinin ikinci satırı sıfır satırı olduğundan lineer sistemin sağ yanının ikinci satırındaki sıfırdan farklı çözümler elenecektir. Böylece (3.6) lineer sisteminden

$$\begin{bmatrix} 1 & 1 & -1 \\ 1 & -1 & 0 \end{bmatrix} \begin{bmatrix} c_1 \\ c_2 \\ c_3 \end{bmatrix} = \begin{bmatrix} 1 & 1 & -1 & -1 \\ 1 & -1 & 1 & -1 \end{bmatrix}$$

denk lineer sistemi elde edilir. Yani, (3.6) lineer sisteminin ikinci denklemi sistemden elenmiştir. Dolayısıyla, eğer tüm $\sigma(X_i)$, $1 \le i \le m$, spektrumları ve $\sigma(X)$

spektrumu tüm özdeğerlerini ters işaretlileri ile birlikte içeriyorsa, bu durumda lineer sistemleri oluşturma sürecinde, bu birbirinin ters işaretlisi olan lineer denklem sol yanlarından birini ele almak yeterli olacaktır. Böylece tüm olası lineer denklem sol yanlarının sayısı $\frac{n_1 n_2 \cdots n_m}{2}$ olur ve çözülmesi gereken lineer sistem sayısı, $\binom{\frac{n_1 n_2 \cdots n_m}{2}}{1}+\binom{\frac{n_1 n_2 \cdots n_m}{2}}{2}+\cdots+\binom{\frac{n_1 n_2 \cdots n_m}{2}}{m}$ sayısına düşer. Birinci paragrafta (3.5) lineer denklem sol yanı lineer sistemleri oluşturma sürecinde ele alınmıyor olsa bile, bu lineer denkleme karşılık gelen blokların, oluşturulmuş olan lineer sistemlerin karşılık gelen Λ_i, $1 \le i \le m$, köşegen matrislerinde içerildiği kabul edilerek sonuçların daha genel matrisler için elde edilebileceğinden bahsetmiştik. Benzer kabulü birbirinin ters işaretlisi olan lineer denklem sol yanı çiftlerinden, lineer sistemleri oluşturma sürecinde ele alınmayan lineer denklem sol yanları için de yapılabilir. Yani, bu ele alınmayan lineer denklem sol yanlarına karşılık gelen bloklar, oluşturulmuş olan lineer sistemlerin karşılık gelen Λ_i, $1 \le i \le m$, köşegen matrislerinde içerildiği kabul edilerek, sonuçlar daha genel matrisler için elde edilebilir. Örneğin, böyle bir durumda, bu kabul altında (3.4) lineer sistemine karşılık gelen Λ_i, $1 \le i \le 4$, köşegen matrisleri, $\sum_{i=1}^{6} r_i = n$ olmak üzere,

$$\Lambda_1 = \lambda_2^{(1)} I_{r_1} \oplus -\lambda_2^{(1)} I_{r_2} \oplus \lambda_2^{(1)} I_{r_3} \oplus -\lambda_2^{(1)} I_{r_4} \oplus \lambda_3^{(1)} I_{r_5} \oplus -\lambda_3^{(1)} I_{r_6},$$

$$\Lambda_2 = \lambda_1^{(2)} I_{r_1} \oplus -\lambda_1^{(2)} I_{r_2} \oplus \lambda_2^{(2)} I_{r_3} \oplus -\lambda_2^{(2)} I_{r_4} \oplus \lambda_2^{(2)} I_{r_5} \oplus -\lambda_2^{(2)} I_{r_6},$$

$$\Lambda_3 = \lambda_1^{(3)} I_{r_1} \oplus -\lambda_1^{(3)} I_{r_2} \oplus \lambda_3^{(3)} I_{r_3} \oplus -\lambda_3^{(3)} I_{r_4} \oplus \lambda_4^{(3)} I_{r_5} \oplus -\lambda_4^{(3)} I_{r_6},$$

$$\Lambda_4 = \lambda_1^{(4)} I_{r_1} \oplus -\lambda_1^{(4)} I_{r_2} \oplus \lambda_2^{(4)} I_{r_3} \oplus -\lambda_2^{(4)} I_{r_4} \oplus \lambda_3^{(4)} I_{r_5} \oplus -\lambda_3^{(4)} I_{r_6}$$

şeklinde olur.

Eğer $\sigma(X_i)$, $1 \le i \le m$, spektrumlarının kesişiminde birden fazla özdeğer içeriliyorsa, bu durumda, çözümleri arasında bir permütasyon olan lineer sistemler ortaya çıkmaktadır. Böyle bir durumda, örneğin, $\{(\alpha_1, \alpha_2, \ldots, \alpha_m), (\beta_1, \beta_2, \ldots, \beta_m)\}$ kümesi bir lineer sistemin çözüm kümesi iken $\{(\alpha_2,\alpha_1,\ldots,\alpha_m),(\beta_2,\beta_1,\ldots,\beta_m)\}$, $\{(\alpha_1,\alpha_m,\ldots,\alpha_2),(\beta_1,\beta_m,\ldots,\beta_2)\}$ veya $\{(\alpha_m,\alpha_1,\ldots,\alpha_{m-1}),(\beta_m,\beta_1,\ldots,\beta_{m-1})\}$ şeklinde kümeler başka lineer sistemlerin çözüm kümeleri olarak karşımıza çıkmaktadır. Dikkat edilirse, bir çözüm kümesindeki çözümlerin hepsinin permütasyonu aynıdır, yani ilk çözüm kümesi için birinci ve ikinci bileşen yer değiştirmiştir, ikinci çözüm kümesi için ikinci ve m-inci bileşen yer değiştirmiştir, ve üçüncü çözüm kümesi için bütün bileşenler bir bileşen sağ tarafa kaymıştır.

(3.1) lineer bileşiminin karakterizasyonu, çözümleri birbirinin ters işaretlisi olan veya çözümleri arasında bir permütasyon olan sonuçların bir araya getirilmesiyle elde edilmektedir. Yani, önce oluşturulan tüm olası lineer sistemler çözülmekte, sonrasında ise çözümleri arasında böyle bir benzerlik ilişkisi olan sonuçlar bir araya getirilerek bir karakteristik elde edilmektedir. Bu karakteristiklerin tümü, bize (3.1) lineer bileşiminin karakterizasyonunu vermektedir. Böylece, (3.1) lineer bileşiminin karakterizasyonunu veren bir kombinatorik yöntem elde edilmiş olur.

3.3. Kombinatorik Yöntemin Algoritması

Bu bölümde önceki bölümde ortaya konulan kombinatorik yöntemden yararlanılarak (3.1) lineer bileşiminin spektrumunun karakterizasyonunu veren bir algoritma verilmektedir.

Algoritma 3.1.

Algoritma

Girdi:	$\sigma(X_i)$, $1\le i\le m$, spektrumları ve $\sigma(X)$ spektrumu
Çıktı:	(3.1) lineer bileşiminin karakterizasyonu
1. Adım:	$\sigma(X_i)$, $1\le i\le m$, spektrumlarının ve $\sigma(X)$ spektrumunun elemanlarını gir.
2. Adım	Tüm olası lineer denklem sol yanlarını ve katlı sağ yanları oluştur.
3. Adım	Eğer (3.5) şeklinde bir lineer denklem sol yanı oluşmuş ise bu sol yanı sil.
4. Adım	Eğer tüm $\sigma(X_i)$, $1\le i\le m$, spektrumları ve $\sigma(X)$ spektrumu tüm elemanlarını ters işaretlileri ile beraber içeriyor ise oluşturulan lineer

		denklem sol yanlarından birbirinin ters işaretlisi olan iki lineer denklem sol yanından birini sil.
5.	Adım	Eksik ve kare lineer sistem sol yanlarını oluştur. (Eğer karakterizasyon lineer bağımsız X_i , $1 \le i \le m$, matrisleri için elde edilmek isteniyor ise sadece kare lineer sistem sol yanlarını oluştur)
6.	Adım	Lineer sistem sol yanlarından sıfır sütunu içerenleri sil
7.	Adım	Oluşturulan lineer sistem sol yanlarının uygun boyutlu katlı sağ yanlarını ekleyerek lineer sistemleri oluştur.
8.	Adım	Oluşturulan tüm lineer sistemleri çöz.
9.	Adım	Çözüm kümelerinin içinden sıfırı içeren çözümleri çıkar.
10.	Adım	Çözümleri arasında bir permütasyon olan veya çözümleri birbirinin ters işaretlisi olan çözüm kümelerini bir araya getirerek bir benzer sonuçlar grubu oluştur.
11.	Adım	Oluşturulan her grup, (3.1) lineer bileşiminin karakterizasyonunun bir karakteristiğine karşılık gelmektedir.

Bu algoritmanın *Mathematica* 9.0 paket programındaki uygulama kodları Ek A kısmında verilmiştir.

BÖLÜM 4. BAZI ÖZEL TİPLİ MATRİSLERİN LİNEER BİLEŞİMLERİNİN KARAKTERİZASYONU

4.1. Giriş

Bu bölümde, üçüncü bölümde geliştirilen Algoritma 3.1 yardımıyla bazı özel tipli matrislerin lineer bileşimlerinin karakterizasyonu elde edilmektedir. Ortaya konulan sonuçlar *Mathematica* 9.0 paket programı yardımıyla elde edildiğinden sonuçların ispatları program çıktısı olarak Ek B kısmında verilmektedir.

4.2. Değişmeli İki Kübik Matrisin Lineer Bileşiminin Kübikliği

Bu kısımda, değişmeli iki kübik matrisin lineer bileşiminin kübikliğinin karakterizasyonu problemi, geliştirilen Algoritma 3.1 yardımı ile çözülecektir.

$X_i \in \mathbb{C}_n$, $\alpha_i, \beta_i, \gamma_i \in \mathbb{C}$, $i = 1,2$, $(X_i - \alpha_i I_n)(X_i - \beta_i I_n)(X_i - \gamma_i I_n) = \mathbf{0}$ ve $X_1 X_2 = X_2 X_1$ olsun. Bu durumda $c_1, c_2 \in \mathbb{C} \setminus \{0\}$ olmak üzere

$$c_1 X_1 + c_2 X_2 = X \tag{4.1}$$

lineer bileşim matrisinin $\{\alpha, \beta, \gamma\}$-kübikliği problemini, diğer bir deyişle $\sigma(X_i) \subseteq \{\alpha_i, \beta_i, \gamma_i\}$ olacak biçimdeki X_i, $i = 1,2$, matrislerinin (4.1) ile verilen X lineer bileşim matrisi, ne zaman $\sigma(X) \subseteq \{\alpha, \beta, \gamma\}$ olacak biçimde bir matris olur problemini ele alalım. Teorem 2.65'den X_i, $i = 1,2$, kübik matrislerinin köşegenleştirilebilir olduğu ve Teorem 2.31'den eşzamanlı köşegenleştirilebilir oldukları bilinmektedir.

Teorem 4.1. $X_i \in \mathbb{C}_n$, $i=1,2$, matrisleri değişmeli iki $\{\alpha_i, \beta_i, \gamma_i\}$-kübik matris ve $c_1, c_2 \in \mathbb{C} \setminus \{0\}$ olsun. Bu durumda, $c_1X_1 + c_2X_2$ lineer bileşim matrisinin bir $\{\alpha, \beta, \gamma\}$-kübik olmasının gerekli ve yeterli koşulu $n_1 + n_2 = n$ ve S, X_1 ve X_2 matrislerini eşzamanlı köşegenleştiren bir tersinir matris olmak üzere, aşağıdaki şartlardan birinin sağlanmasıdır:

1) $c_1 + \frac{\alpha_2}{\alpha_1}c_2 \in \left\{\frac{\alpha}{\alpha_1}, \frac{\beta}{\alpha_1}, \frac{\gamma}{\alpha_1}\right\}$, $S^{-1}X_1S = \alpha_1 I_n$, $S^{-1}X_2S = \alpha_2 I_n$ ve $\alpha_1 \neq 0$,

2) $c_1 + \frac{\beta_2}{\alpha_1}c_2 \in \left\{\frac{\alpha}{\alpha_1}, \frac{\beta}{\alpha_1}, \frac{\gamma}{\alpha_1}\right\}$, $S^{-1}X_1S = \alpha_1 I_n$, $S^{-1}X_2S = \beta_2 I_n$ ve $\alpha_1 \neq 0$,

3) $c_1 + \frac{\gamma_2}{\alpha_1}c_2 \in \left\{\frac{\alpha}{\alpha_1}, \frac{\beta}{\alpha_1}, \frac{\gamma}{\alpha_1}\right\}$, $S^{-1}X_1S = \alpha_1 I_n$, $S^{-1}X_2S = \gamma_2 I_n$ ve $\alpha_1 \neq 0$,

4) $c_1 + \frac{\alpha_2}{\beta_1}c_2 \in \left\{\frac{\alpha}{\beta_1}, \frac{\beta}{\beta_1}, \frac{\gamma}{\beta_1}\right\}$, $S^{-1}X_1S = \beta_1 I_n$, $S^{-1}X_2S = \alpha_2 I_n$ ve $\beta_1 \neq 0$,

5) $c_1 + \frac{\beta_2}{\beta_1}c_2 \in \left\{\frac{\alpha}{\beta_1}, \frac{\beta}{\beta_1}, \frac{\gamma}{\beta_1}\right\}$, $S^{-1}X_1S = \beta_1 I_n$, $S^{-1}X_2S = \beta_2 I_n$ ve $\beta_1 \neq 0$,

6) $c_1 + \frac{\gamma_2}{\beta_1}c_2 \in \left\{\frac{\alpha}{\beta_1}, \frac{\beta}{\beta_1}, \frac{\gamma}{\beta_1}\right\}$, $S^{-1}X_1S = \beta_1 I_n$, $S^{-1}X_2S = \gamma_2 I_n$ ve $\beta_1 \neq 0$,

7) $c_1 + \frac{\alpha_2}{\gamma_1}c_2 \in \left\{\frac{\alpha}{\gamma_1}, \frac{\beta}{\gamma_1}, \frac{\gamma}{\gamma_1}\right\}$, $S^{-1}X_1S = \gamma_1 I_n$, $S^{-1}X_2S = \alpha_2 I_n$ ve $\gamma_1 \neq 0$,

8) $c_1 + \frac{\beta_2}{\gamma_1}c_2 \in \left\{\frac{\alpha}{\gamma_1}, \frac{\beta}{\gamma_1}, \frac{\gamma}{\gamma_1}\right\}$, $S^{-1}X_1S = \gamma_1 I_n$, $S^{-1}X_2S = \beta_2 I_n$ ve $\gamma_1 \neq 0$,

9) $c_1 + \frac{\gamma_2}{\gamma_1}c_2 \in \left\{\frac{\alpha}{\gamma_1}, \frac{\beta}{\gamma_1}, \frac{\gamma}{\gamma_1}\right\}$, $S^{-1}X_1S = \gamma_1 I_n$, $S^{-1}X_2S = \gamma_2 I_n$ ve $\gamma_1 \neq 0$,

10) $$(c_1, c_2) \in \left\{ \begin{array}{l} \left(\frac{-\alpha\beta_2+\alpha_2\beta}{\alpha_1(\alpha_2-\beta_2)}, \frac{\alpha-\beta}{\alpha_2-\beta_2}\right), \left(\frac{-\alpha\beta_2+\alpha_2\gamma}{\alpha_1(\alpha_2-\beta_2)}, \frac{\alpha-\gamma}{\alpha_2-\beta_2}\right), \left(\frac{\alpha_2\alpha-\beta_2\beta}{\alpha_1(\alpha_2-\beta_2)}, \frac{\beta-\alpha}{\alpha_2-\beta_2}\right), \\ \left(\frac{-\beta_2\beta+\alpha_2\gamma}{\alpha_1(\alpha_2-\beta_2)}, \frac{\beta-\gamma}{\alpha_2-\beta_2}\right), \left(\frac{\alpha_2\alpha-\beta_2\gamma}{\alpha_1(\alpha_2-\beta_2)}, \frac{\gamma-\alpha}{\alpha_2-\beta_2}\right), \left(\frac{\alpha_2\beta-\beta_2\gamma}{\alpha_1(\alpha_2-\beta_2)}, \frac{\gamma-\beta}{\alpha_2-\beta_2}\right) \end{array} \right\},$$

$S^{-1}X_1S = \alpha_1 I_{n_1} \oplus \alpha_1 I_{n_2}$, $S^{-1}X_2S = \alpha_2 I_{n_1} \oplus \beta_2 I_{n_2}$, $\alpha_1 \neq 0$ ve $\alpha_2 - \beta_2 \neq 0$,

11) $$(c_1, c_2) \in \left\{ \begin{array}{l} \left(\frac{-\alpha\gamma_2+\alpha_2\beta}{\alpha_1(\alpha_2-\gamma_2)}, \frac{\alpha-\beta}{\alpha_2-\gamma_2}\right), \left(\frac{-\alpha\gamma_2+\alpha_2\gamma}{\alpha_1(\alpha_2-\gamma_2)}, \frac{\alpha-\gamma}{\alpha_2-\gamma_2}\right), \left(\frac{\alpha_2\alpha-\gamma_2\beta}{\alpha_1(\alpha_2-\gamma_2)}, \frac{\beta-\alpha}{\alpha_2-\gamma_2}\right), \\ \left(\frac{-\gamma_2\beta+\alpha_2\gamma}{\alpha_1(\alpha_2-\gamma_2)}, \frac{\beta-\gamma}{\alpha_2-\gamma_2}\right), \left(\frac{\alpha_2\alpha-\gamma_2\gamma}{\alpha_1(\alpha_2-\gamma_2)}, \frac{\gamma-\alpha}{\alpha_2-\gamma_2}\right), \left(\frac{\alpha_2\beta-\gamma_2\gamma}{\alpha_1(\alpha_2-\gamma_2)}, \frac{\gamma-\beta}{\alpha_2-\gamma_2}\right) \end{array} \right\},$$

$S^{-1}X_1S = \alpha_1 I_{n_1} \oplus \alpha_1 I_{n_2}$, $S^{-1}X_2S = \alpha_2 I_{n_1} \oplus \gamma_2 I_{n_2}$, $\alpha_1 \neq 0$ ve $\alpha_2 - \gamma_2 \neq 0$,

$$12)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha-\gamma}{\alpha_1-\beta_1},\frac{-\alpha\beta_1+\alpha_1\beta}{\alpha_2(\alpha_1-\beta_1)}\right),\left(\frac{\alpha-\beta}{\alpha_1-\beta_1},\frac{-\alpha\beta_1+\alpha_1\gamma}{\alpha_2(\alpha_1-\beta_1)}\right),\left(\frac{\beta-\alpha}{\alpha_1-\beta_1},\frac{\alpha_1\alpha-\beta_1\beta}{\alpha_2(\alpha_1-\beta_1)}\right),\\ \left(\frac{\beta-\gamma}{\alpha_1-\beta_1},\frac{-\beta_1\beta+\alpha_1\gamma}{\alpha_2(\alpha_1-\beta_1)}\right),\left(\frac{\gamma-\alpha}{\alpha_1-\beta_1},\frac{\alpha_1\alpha-\beta_1\gamma}{\alpha_2(\alpha_1-\beta_1)}\right),\left(\frac{\gamma-\beta}{\alpha_1-\beta_1},\frac{\alpha_1\beta-\beta_1\gamma}{\alpha_2(\alpha_1-\beta_1)}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\beta_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\alpha_2I_{n_2},\ \alpha_2\neq 0 \text{ ve } \alpha_2-\beta_2\neq 0,$$

$$13)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\alpha_2\alpha+\alpha\beta_2}{-\alpha_2\beta_1+\alpha_1\beta_2},\frac{\alpha_1\alpha-\alpha\beta_1}{-\alpha_2\beta_1+\alpha_1\beta_2}\right),\left(\frac{\alpha\beta_2-\alpha_2\beta}{-\alpha_2\beta_1+\alpha_1\beta_2},\frac{\alpha\beta_1-\alpha_1\beta}{\alpha_2\beta_1-\alpha_1\beta_2}\right),\left(\frac{\alpha\beta_2-\alpha_2\gamma}{-\alpha_2\beta_1+\alpha_1\beta_2},\frac{\alpha\beta_1-\alpha_1\gamma}{\alpha_2\beta_1-\alpha_1\beta_2}\right),\\ \left(\frac{-\alpha_2\alpha+\beta_2\beta}{-\alpha_2\beta_1+\alpha_1\beta_2},\frac{-\alpha_1\alpha+\beta_1\beta}{\alpha_2\beta_1-\alpha_1\beta_2}\right),\left(\frac{-\alpha_2\beta+\beta_2\beta}{-\alpha_2\beta_1+\alpha_1\beta_2},\frac{-\alpha_1\beta+\beta_1\beta}{\alpha_2\beta_1-\alpha_1\beta_2}\right),\left(\frac{\beta_2\beta-\alpha_2\gamma}{-\alpha_2\beta_1+\alpha_1\beta_2},\frac{\beta_1\beta-\alpha_1\gamma}{\alpha_2\beta_1-\alpha_1\beta_2}\right),\\ \left(\frac{-\alpha_2\alpha+\beta_2\gamma}{-\alpha_2\beta_1+\alpha_1\beta_2},\frac{-\alpha_1\alpha+\beta_1\gamma}{\alpha_2\beta_1-\alpha_1\beta_2}\right),\left(\frac{-\alpha_2\beta+\beta_2\gamma}{-\alpha_2\beta_1+\alpha_1\beta_2},\frac{-\alpha_1\beta+\beta_1\gamma}{\alpha_2\beta_1-\alpha_1\beta_2}\right),\left(\frac{-\alpha_2\gamma+\beta_2\gamma}{-\alpha_2\beta_1+\alpha_1\beta_2},\frac{-\alpha_1\gamma+\beta_1\gamma}{\alpha_2\beta_1-\alpha_1\beta_2}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\beta_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\beta_2I_{n_2} \text{ ve } \alpha_2\beta_1-\alpha_1\beta_2\neq 0,$$

$$14)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\alpha_2\alpha+\alpha\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2},\frac{\alpha_1\alpha-\alpha\beta_1}{-\alpha_2\beta_1+\alpha_1\gamma_2}\right),\left(\frac{-\alpha_2\beta+\alpha\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2},\frac{\alpha\beta_1-\alpha_1\beta}{\alpha_2\beta_1-\alpha_1\gamma_2}\right),\left(\frac{\alpha\gamma_2-\alpha_2\gamma}{-\alpha_2\beta_1+\alpha_1\gamma_2},\frac{\alpha\beta_1-\alpha_1\gamma}{\alpha_2\beta_1-\alpha_1\gamma_2}\right),\\ \left(\frac{-\alpha_2\alpha+\beta\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2},\frac{\alpha_1\alpha-\beta_1\beta}{-\alpha_2\beta_1+\alpha_1\gamma_2}\right),\left(\frac{-\alpha_2\beta+\beta\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2},\frac{\alpha_1\beta-\beta_1\beta}{-\alpha_2\beta_1+\alpha_1\gamma_2}\right),\left(\frac{\beta\gamma_2-\alpha_2\gamma}{-\alpha_2\beta_1+\alpha_1\gamma_2},\frac{\beta_1\beta-\alpha_1\gamma}{\alpha_2\beta_1-\alpha_1\gamma_2}\right),\\ \left(\frac{-\alpha_2\alpha+\gamma_2\gamma}{-\alpha_2\beta_1+\alpha_1\gamma_2},\frac{-\alpha_1\alpha+\beta_1\gamma}{\alpha_2\beta_1-\alpha_1\gamma_2}\right),\left(\frac{-\alpha_2\beta+\beta_2\gamma}{-\alpha_2\beta_1+\alpha_1\gamma_2},\frac{-\alpha_1\beta+\beta_1\gamma}{\alpha_2\beta_1-\alpha_1\gamma_2}\right),\left(\frac{-\alpha_2\gamma+\gamma_2\gamma}{-\alpha_2\beta_1+\alpha_1\gamma_2},\frac{-\alpha_1\gamma+\beta_1\gamma}{\alpha_2\beta_1-\alpha_1\gamma_2}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\beta_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\gamma_2I_{n_2} \text{ ve } \alpha_2\beta_1-\alpha_1\gamma_2\neq 0,$$

$$15)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha-\beta}{\alpha_1-\gamma_1},\frac{\alpha_1\beta-\alpha\gamma_1}{\alpha_2(\alpha_1-\gamma_1)}\right),\left(\frac{\alpha-\gamma}{\alpha_1-\gamma_1},\frac{-\alpha\gamma_1+\alpha_1\gamma}{\alpha_2(\alpha_1-\gamma_1)}\right),\left(\frac{\beta-\alpha}{\alpha_1-\gamma_1},\frac{\alpha_1\alpha-\beta\gamma_1}{\alpha_2(\alpha_1-\gamma_1)}\right),\\ \left(\frac{\beta-\gamma}{\alpha_1-\gamma_1},\frac{-\beta\gamma_1+\alpha_1\gamma}{\alpha_2(\alpha_1-\gamma_1)}\right),\left(\frac{\gamma-\alpha}{\alpha_1-\gamma_1},\frac{\alpha_1\alpha-\gamma_1\gamma}{\alpha_2(\alpha_1-\gamma_1)}\right),\left(\frac{\gamma-\beta}{\alpha_1-\gamma_1},\frac{\alpha_1\beta-\gamma_1\gamma}{\alpha_2(\alpha_1-\gamma_1)}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\gamma_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\alpha_2I_{n_2},\ \alpha_2\neq 0 \text{ ve } \alpha_1-\gamma_1\neq 0,$$

$$16)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\alpha_2\alpha+\alpha\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1},\frac{\alpha_1\alpha-\alpha\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{\alpha\beta_2-\alpha_2\beta}{\alpha_1\beta_2-\alpha_2\gamma_1},\frac{\alpha_1\beta-\alpha\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{\alpha\beta_2-\alpha_2\gamma}{\alpha_1\beta_2-\alpha_2\gamma_1},\frac{\alpha_1\gamma-\alpha\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1}\right),\\ \left(\frac{-\alpha_2\alpha+\beta\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1},\frac{\alpha_1\alpha-\gamma_1\beta}{\alpha_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\beta+\beta_2\beta}{\alpha_1\beta_2-\alpha_2\gamma_1},\frac{\alpha_1\beta-\beta\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{\beta\beta_2-\alpha_2\gamma}{\alpha_1\beta_2-\alpha_2\gamma_1},\frac{-\beta\gamma_1+\alpha_1\gamma}{\alpha_1\beta_2-\alpha_2\gamma_1}\right),\\ \left(\frac{-\alpha_2\alpha+\beta_2\gamma}{\alpha_1\beta_2-\alpha_2\gamma_1},\frac{\alpha_1\alpha-\gamma_1\gamma}{\alpha_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\beta+\beta_2\gamma}{\alpha_1\beta_2-\alpha_2\gamma_1},\frac{\alpha_1\beta-\gamma_1\gamma}{\alpha_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\gamma+\beta_2\gamma}{\alpha_1\beta_2-\alpha_2\gamma_1},\frac{\alpha_1\gamma-\gamma_1\gamma}{\alpha_1\beta_2-\alpha_2\gamma_1}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\gamma_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\beta_2I_{n_2} \text{ ve } \alpha_1\beta_2-\alpha_2\gamma_1\neq 0,$$

$$17)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\alpha_2\alpha+\alpha\gamma_2}{\alpha_1\gamma_2-\alpha_2\gamma_1},\frac{\alpha_1\alpha-\alpha\gamma_1}{\alpha_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{\alpha\gamma_2-\alpha_2\beta}{\alpha_1\gamma_2-\alpha_2\gamma_1},\frac{\alpha_1\beta-\alpha\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{\alpha\gamma_2-\alpha_2\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1},\frac{\alpha\gamma_1-\alpha_1\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1}\right),\\ \left(\frac{-\alpha_2\alpha+\gamma_2\beta}{\alpha_1\gamma_2-\alpha_2\gamma_1},\frac{\alpha_1\alpha-\gamma_1\beta}{\alpha_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\beta+\gamma_2\beta}{\alpha_1\gamma_2-\alpha_2\gamma_1},\frac{\alpha_1\beta-\gamma_1\beta}{\alpha_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{\gamma_2\beta-\alpha_2\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1},\frac{\gamma_1\beta-\alpha_1\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1}\right),\\ \left(\frac{-\alpha_2\alpha+\gamma_2\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1},\frac{-\alpha_1\alpha+\gamma_1\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\beta+\gamma_2\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1},\frac{-\alpha_1\beta+\gamma_1\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\gamma+\gamma_2\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1},\frac{-\alpha_1\gamma+\gamma_1\gamma}{\alpha_1\gamma_2-\alpha_2\gamma_1}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\gamma_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\gamma_2I_{n_2} \text{ ve } \alpha_1\gamma_2-\alpha_2\gamma_1\neq 0,$$

18) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\beta_2\beta-\alpha\gamma_2}{\alpha_1(\beta_2-\gamma_2)},\frac{\alpha-\beta}{\beta_2-\gamma_2}\right),\left(\frac{-\alpha\gamma_2+\beta_2\gamma}{\alpha_1(\beta_2-\gamma_2)},\frac{\alpha-\gamma}{\beta_2-\gamma_2}\right),\left(\frac{\beta_2\alpha-\gamma_2\beta}{\alpha_1(\beta_2-\gamma_2)},\frac{\beta-\alpha}{\beta_2-\gamma_2}\right),\\ \left(\frac{-\gamma_2\beta+\beta_2\gamma}{\alpha_1(\beta_2-\gamma_2)},\frac{\beta-\gamma}{\beta_2-\gamma_2}\right),\left(\frac{\beta_2\alpha-\gamma_2\gamma}{\alpha_1(\beta_2-\gamma_2)},\frac{\gamma-\alpha}{\beta_2-\gamma_2}\right),\left(\frac{\beta_2\beta-\gamma_2\gamma}{\alpha_1(\beta_2-\gamma_2)},\frac{\gamma-\beta}{\beta_2-\gamma_2}\right)\end{array}\right\}$,

$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\alpha_1I_{n_2}$, $S^{-1}X_2S=\beta_2I_{n_1}\oplus\gamma_2I_{n_2}$, $\alpha_1\neq 0$ ve $\beta_2-\gamma_2\neq 0$,

19) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha_2\alpha-\alpha\beta_2}{\alpha_1\alpha_2-\beta_1\beta_2},\frac{\alpha_1\alpha-\alpha\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2}\right),\left(\frac{\alpha_2\alpha-\beta_2\beta}{\alpha_1\alpha_2-\beta_1\beta_2},\frac{-\alpha\beta_1+\alpha_1\beta}{\alpha_1\alpha_2-\beta_1\beta_2}\right),\left(\frac{\alpha_2\alpha-\beta_2\gamma}{\alpha_1\alpha_2-\beta_1\beta_2},\frac{\alpha_1\gamma-\alpha\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2}\right),\\ \left(\frac{-\beta_2\alpha+\beta\alpha_2}{\alpha_1\alpha_2-\beta_1\beta_2},\frac{\alpha_1\alpha-\beta_1\beta}{\alpha_1\alpha_2-\beta_1\beta_2}\right),\left(\frac{\alpha_2\beta-\beta_2\beta}{\alpha_1\alpha_2-\beta_1\beta_2},\frac{\alpha_1\beta-\beta\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2}\right),\left(\frac{\beta\alpha_2-\beta_2\gamma}{\alpha_1\alpha_2-\beta_1\beta_2},\frac{-\beta\beta_1+\alpha_1\gamma}{\alpha_1\alpha_2-\beta_1\beta_2}\right),\\ \left(\frac{-\beta_2\alpha+\alpha_2\gamma}{\alpha_1\alpha_2-\beta_1\beta_2},\frac{\alpha_1\alpha-\beta_1\gamma}{\alpha_1\alpha_2-\beta_1\beta_2}\right),\left(\frac{-\beta_2\beta+\alpha_2\gamma}{\alpha_1\alpha_2-\beta_1\beta_2},\frac{\alpha_1\beta-\beta_1\gamma}{\alpha_1\alpha_2-\beta_1\beta_2}\right),\left(\frac{\alpha_2\gamma-\beta_2\gamma}{\alpha_1\alpha_2-\beta_1\beta_2},\frac{\alpha_1\gamma-\beta_1\gamma}{\alpha_1\alpha_2-\beta_1\beta_2}\right)\end{array}\right\}$,

$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\beta_1I_{n_2}$, $S^{-1}X_2S=\beta_2I_{n_1}\oplus\alpha_2I_{n_2}$ ve $\alpha_1\alpha_2-\beta_1\beta_2\neq 0$,

20) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha-\beta}{\alpha_1-\beta_1},\frac{\alpha_1\beta-\alpha\beta_1}{\beta_2(\alpha_1-\beta_1)}\right),\left(\frac{\alpha-\gamma}{\alpha_1-\beta_1},\frac{-\alpha\beta_1+\alpha_1\gamma}{\beta_2(\alpha_1-\beta_1)}\right),\left(\frac{\beta-\alpha}{\alpha_1-\beta_1},\frac{\alpha_1\alpha-\beta\beta_1}{\beta_2(\alpha_1-\beta_1)}\right),\\ \left(\frac{\beta-\gamma}{\alpha_1-\beta_1},\frac{-\beta\beta_1+\alpha_1\gamma}{\beta_2(\alpha_1-\beta_1)}\right),\left(\frac{\gamma-\alpha}{\alpha_1-\beta_1},\frac{\alpha_1\alpha-\beta_1\gamma}{\beta_2(\alpha_1-\beta_1)}\right),\left(\frac{\gamma-\beta}{\alpha_1-\beta_1},\frac{\alpha_1\beta-\beta_1\gamma}{\beta_2(\alpha_1-\beta_1)}\right)\end{array}\right\}$,

$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\beta_1I_{n_2}$, $S^{-1}X_2S=\beta_2I_{n_1}\oplus\beta_2I_{n_2}$, $\beta_2\neq 0$ ve $\alpha_1-\beta_1\neq 0$,

21) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\beta_2\alpha+\alpha\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2},\frac{\alpha_1\alpha-\alpha\beta_1}{-\beta_1\beta_2+\alpha_1\gamma_2}\right),\left(\frac{-\beta_2\beta+\alpha\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2},\frac{\alpha\beta_1-\alpha_1\beta}{\beta_1\beta_2-\alpha_1\gamma_2}\right),\left(\frac{\alpha\gamma_2-\beta_2\gamma}{-\beta_1\beta_2+\alpha_1\gamma_2},\frac{\alpha\beta_1-\alpha_1\gamma}{\beta_1\beta_2-\alpha_1\gamma_2}\right),\\ \left(\frac{-\beta_2\alpha+\beta\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2},\frac{\alpha_1\alpha-\beta_1\beta}{-\beta_1\beta_2+\alpha_1\gamma_2}\right),\left(\frac{-\beta_2\beta+\beta\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2},\frac{\alpha_1\beta-\beta_1\beta}{-\beta_1\beta_2+\alpha_1\gamma_2}\right),\left(\frac{\beta\gamma_2-\beta_2\gamma}{-\beta_1\beta_2+\alpha_1\gamma_2},\frac{\beta_1\beta-\alpha_1\gamma}{\beta_1\beta_2-\alpha_1\gamma_2}\right),\\ \left(\frac{-\beta_2\alpha+\gamma_2\gamma}{-\beta_1\beta_2+\alpha_1\gamma_2},\frac{-\alpha_1\alpha+\beta_1\gamma}{\beta_1\beta_2-\alpha_1\gamma_2}\right),\left(\frac{-\beta_2\beta+\gamma_2\gamma}{-\beta_1\beta_2+\alpha_1\gamma_2},\frac{-\alpha_1\beta+\beta_1\gamma}{\beta_1\beta_2-\alpha_1\gamma_2}\right),\left(\frac{-\beta_2\gamma+\gamma_2\gamma}{-\beta_1\beta_2+\alpha_1\gamma_2},\frac{-\alpha_1\gamma+\beta_1\gamma}{\beta_1\beta_2-\alpha_1\gamma_2}\right)\end{array}\right\}$,

$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\beta_1I_{n_2}$, $S^{-1}X_2S=\beta_2I_{n_1}\oplus\gamma_2I_{n_2}$ ve $\beta_1\beta_2-\alpha_1\gamma_2\neq 0$,

22) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha_2\alpha-\alpha\beta_2}{\alpha_1\alpha_2-\beta_2\gamma_1},\frac{\alpha_1\alpha-\alpha\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{\alpha_2\alpha-\beta_2\beta}{\alpha_1\alpha_2-\beta_2\gamma_1},\frac{-\alpha\gamma_1+\alpha_1\beta}{\alpha_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{\alpha_2\alpha-\beta_2\gamma}{\alpha_1\alpha_2-\beta_2\gamma_1},\frac{\alpha_1\gamma-\alpha\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1}\right),\\ \left(\frac{-\beta_2\alpha+\beta\alpha_2}{\alpha_1\alpha_2-\beta_2\gamma_1},\frac{\alpha_1\alpha-\gamma_1\beta}{\alpha_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{\alpha_2\beta-\beta_2\beta}{\alpha_1\alpha_2-\beta_2\gamma_1},\frac{\alpha_1\beta-\beta\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{\beta\alpha_2-\beta_2\gamma}{\alpha_1\alpha_2-\beta_2\gamma_1},\frac{-\beta\gamma_1+\alpha_1\gamma}{\alpha_1\alpha_2-\beta_2\gamma_1}\right),\\ \left(\frac{-\beta_2\alpha+\alpha_2\gamma}{\alpha_1\alpha_2-\beta_2\gamma_1},\frac{\alpha_1\alpha-\gamma_1\gamma}{\alpha_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{-\beta_2\beta+\alpha_2\gamma}{\alpha_1\alpha_2-\beta_2\gamma_1},\frac{\alpha_1\beta-\gamma_1\gamma}{\alpha_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{\alpha_2\gamma-\beta_2\gamma}{\alpha_1\alpha_2-\beta_2\gamma_1},\frac{\alpha_1\gamma-\gamma_1\gamma}{\alpha_1\alpha_2-\beta_2\gamma_1}\right)\end{array}\right\}$,

$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\gamma_1I_{n_2}$, $S^{-1}X_2S=\beta_2I_{n_1}\oplus\gamma_2I_{n_2}$ ve $\alpha_1\alpha_2-\beta_2\gamma_1\neq 0$,

23) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha-\beta}{\alpha_1-\gamma_1},\frac{\alpha_1\beta-\alpha\gamma_1}{\beta_2(\alpha_1-\gamma_1)}\right),\left(\frac{\alpha-\gamma}{\alpha_1-\gamma_1},\frac{-\alpha\gamma_1+\alpha_1\gamma}{\beta_2(\alpha_1-\gamma_1)}\right),\left(\frac{\beta-\alpha}{\alpha_1-\gamma_1},\frac{\alpha_1\alpha-\beta\gamma_1}{\beta_2(\alpha_1-\gamma_1)}\right),\\ \left(\frac{\beta-\gamma}{\alpha_1-\gamma_1},\frac{-\beta\gamma_1+\alpha_1\gamma}{\beta_2(\alpha_1-\gamma_1)}\right),\left(\frac{\gamma-\alpha}{\alpha_1-\gamma_1},\frac{\alpha_1\alpha-\gamma_1\gamma}{\beta_2(\alpha_1-\gamma_1)}\right),\left(\frac{\gamma-\beta}{\alpha_1-\gamma_1},\frac{\alpha_1\beta-\gamma_1\gamma}{\beta_2(\alpha_1-\gamma_1)}\right)\end{array}\right\}$,

$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\gamma_1I_{n_2}$, $S^{-1}X_2S=\beta_2I_{n_1}\oplus\beta_2I_{n_2}$, $\beta_2\neq 0$ ve $\alpha_1-\gamma_1\neq 0$,

$$24)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\beta_2\alpha+\alpha\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2},\frac{\alpha_1\alpha-\alpha\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2}\right),\left(\frac{-\beta_2\beta+\alpha\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2},\frac{\alpha_1\beta-\alpha\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2}\right),\left(\frac{\alpha\gamma_2-\beta_2\gamma}{-\beta_2\gamma_1+\alpha_1\gamma_2},\frac{\alpha\gamma_1-\alpha_1\gamma}{\beta_2\gamma_1-\alpha_1\gamma_2}\right),\\ \left(\frac{-\beta_2\alpha+\beta\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2},\frac{\alpha_1\alpha-\gamma_1\beta}{-\beta_2\gamma_1+\alpha_1\gamma_2}\right),\left(\frac{-\beta_2\beta+\beta\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2},\frac{\alpha_1\beta-\gamma_1\beta}{-\beta_2\gamma_1+\alpha_1\gamma_2}\right),\left(\frac{\beta\gamma_2-\beta_2\gamma}{-\beta_2\gamma_1+\alpha_1\gamma_2},\frac{\gamma_1\beta-\alpha_1\gamma}{\beta_2\gamma_1-\alpha_1\gamma_2}\right),\\ \left(\frac{-\beta_2\alpha+\gamma_2\gamma}{-\beta_2\gamma_1+\alpha_1\gamma_2},\frac{-\alpha_1\alpha+\gamma_1\gamma}{\beta_2\gamma_1-\alpha_1\gamma_2}\right),\left(\frac{-\beta_2\beta+\gamma_2\gamma}{-\beta_2\gamma_1+\alpha_1\gamma_2},\frac{-\alpha_1\beta+\gamma_1\gamma}{\beta_2\gamma_1-\alpha_1\gamma_2}\right),\left(\frac{-\beta_2\gamma+\gamma_2\gamma}{-\beta_2\gamma_1+\alpha_1\gamma_2},\frac{-\alpha_1\gamma+\gamma_1\gamma}{\beta_2\gamma_1-\alpha_1\gamma_2}\right)\end{array}\right\},$$

$S^{-1}X_1S=\alpha_1 I_{n_1}\oplus\gamma_1 I_{n_2}$, $S^{-1}X_2S=\beta_2 I_{n_1}\oplus\gamma_2 I_{n_2}$ ve $\beta_2\gamma_1-\alpha_1\gamma_2\neq 0$,

$$25)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha_2\alpha-\alpha\gamma_2}{\alpha_1\alpha_2-\beta_1\gamma_2},\frac{\alpha_1\alpha-\alpha\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2}\right),\left(\frac{\alpha_2\alpha-\gamma_2\beta}{\alpha_1\alpha_2-\beta_1\gamma_2},\frac{\alpha\beta_1-\alpha_1\beta}{-\alpha_1\alpha_2+\beta_1\gamma_2}\right),\left(\frac{\alpha_2\alpha-\gamma_2\gamma}{\alpha_1\alpha_2-\beta_1\gamma_2},\frac{\alpha_1\gamma-\alpha\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2}\right),\\ \left(\frac{-\gamma_2\alpha+\beta\alpha_2}{\alpha_1\alpha_2-\beta_1\gamma_2},\frac{\alpha_1\alpha-\beta_1\beta}{\alpha_1\alpha_2-\beta_1\gamma_2}\right),\left(\frac{\alpha_2\beta-\beta_2\beta}{\alpha_1\alpha_2-\beta_1\gamma_2},\frac{\alpha_1\beta-\beta\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2}\right),\left(\frac{\beta\alpha_2-\gamma_2\gamma}{\alpha_1\alpha_2-\beta_1\gamma_2},\frac{-\beta\beta_1+\alpha_1\gamma}{\alpha_1\alpha_2-\beta_1\gamma_2}\right),\\ \left(\frac{-\gamma_2\alpha+\alpha_2\gamma}{\alpha_1\alpha_2-\beta_1\gamma_2},\frac{\alpha_1\alpha-\beta_1\gamma}{\alpha_1\alpha_2-\beta_1\gamma_2}\right),\left(\frac{-\gamma_2\beta+\alpha_2\gamma}{\alpha_1\alpha_2-\beta_1\gamma_2},\frac{\alpha_1\beta-\beta_1\gamma}{\alpha_1\alpha_2-\beta_1\gamma_2}\right),\left(\frac{\alpha_2\gamma-\gamma_2\gamma}{\alpha_1\alpha_2-\beta_1\gamma_2},\frac{\alpha_1\gamma-\beta_1\gamma}{\alpha_1\alpha_2-\beta_1\gamma_2}\right)\end{array}\right\},$$

$S^{-1}X_1S=\alpha_1 I_{n_1}\oplus\beta_1 I_{n_2}$, $S^{-1}X_2S=\gamma_2 I_{n_1}\oplus\alpha_2 I_{n_2}$ ve $\alpha_1\alpha_2-\beta_1\gamma_2\neq 0$,

$$26)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\beta_2\alpha-\alpha\gamma_2}{\alpha_1\beta_2-\beta_1\gamma_2},\frac{\alpha_1\alpha-\alpha\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2}\right),\left(\frac{\beta_2\alpha-\gamma_2\beta}{\alpha_1\beta_2-\beta_1\gamma_2},\frac{\alpha\beta_1-\alpha_1\beta}{-\alpha_1\beta_2+\beta_1\gamma_2}\right),\left(\frac{\beta_2\alpha-\gamma_2\gamma}{\alpha_1\beta_2-\beta_1\gamma_2},\frac{\alpha_1\gamma-\alpha\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2}\right),\\ \left(\frac{-\gamma_2\alpha+\beta\beta_2}{\alpha_1\beta_2-\beta_1\gamma_2},\frac{\alpha_1\alpha-\beta_1\beta}{\alpha_1\beta_2-\beta_1\gamma_2}\right),\left(\frac{\beta_2\beta-\beta_2\beta}{\alpha_1\beta_2-\beta_1\gamma_2},\frac{\alpha_1\beta-\beta\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2}\right),\left(\frac{\beta\beta_2-\gamma_2\gamma}{\alpha_1\beta_2-\beta_1\gamma_2},\frac{-\beta\beta_1+\alpha_1\gamma}{\alpha_1\beta_2-\beta_1\gamma_2}\right),\\ \left(\frac{-\gamma_2\alpha+\beta_2\gamma}{\alpha_1\beta_2-\beta_1\gamma_2},\frac{\alpha_1\alpha-\beta_1\gamma}{\alpha_1\beta_2-\beta_1\gamma_2}\right),\left(\frac{-\gamma_2\beta+\beta_2\gamma}{\alpha_1\beta_2-\beta_1\gamma_2},\frac{\alpha_1\beta-\beta_1\gamma}{\alpha_1\beta_2-\beta_1\gamma_2}\right),\left(\frac{\beta_2\gamma-\gamma_2\gamma}{\alpha_1\beta_2-\beta_1\gamma_2},\frac{\alpha_1\gamma-\beta_1\gamma}{\alpha_1\beta_2-\beta_1\gamma_2}\right)\end{array}\right\},$$

$S^{-1}X_1S=\alpha_1 I_{n_1}\oplus\beta_1 I_{n_2}$, $S^{-1}X_2S=\gamma_2 I_{n_1}\oplus\beta_2 I_{n_2}$ ve $\alpha_1\beta_2-\beta_1\gamma_2\neq 0$,

$$27)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha-\beta}{\alpha_1-\beta_1},\frac{\alpha\beta_1-\alpha_1\beta}{\gamma_2(-\alpha_1+\beta_1)}\right),\left(\frac{\alpha-\gamma}{\alpha_1-\beta_1},\frac{-\alpha\beta_1+\alpha_1\gamma}{\gamma_2(\alpha_1-\beta_1)}\right),\left(\frac{\beta-\alpha}{\alpha_1-\beta_1},\frac{\alpha_1\alpha-\beta\beta_1}{\gamma_2(\alpha_1-\beta_1)}\right),\\ \left(\frac{\beta-\gamma}{\alpha_1-\beta_1},\frac{-\beta\beta_1+\alpha_1\gamma}{\gamma_2(\alpha_1-\beta_1)}\right),\left(\frac{\gamma-\alpha}{\alpha_1-\beta_1},\frac{\alpha_1\alpha-\beta_1\gamma}{\gamma_2(\alpha_1-\beta_1)}\right),\left(\frac{\gamma-\beta}{\alpha_1-\beta_1},\frac{\alpha_1\beta-\beta_1\gamma}{\gamma_2(\alpha_1-\beta_1)}\right)\end{array}\right\},$$

$S^{-1}X_1S=\alpha_1 I_{n_1}\oplus\beta_1 I_{n_2}$, $S^{-1}X_2S=\gamma_2 I_{n_1}\oplus\gamma_2 I_{n_2}$, $\gamma_2\neq 0$ ve $\alpha_1-\beta_1\neq 0$,

$$28)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha_2\alpha-\alpha\gamma_2}{\alpha_1\alpha_2-\gamma_1\gamma_2},\frac{\alpha_1\alpha-\alpha\beta_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}\right),\left(\frac{\alpha_2\alpha-\gamma_2\beta}{\alpha_1\alpha_2-\gamma_1\gamma_2},\frac{\alpha_1\beta-\alpha\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}\right),\left(\frac{\alpha_2\alpha-\gamma_2\gamma}{\alpha_1\alpha_2-\gamma_1\gamma_2},\frac{\alpha_1\gamma-\alpha\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}\right),\\ \left(\frac{-\gamma_2\alpha+\beta\alpha_2}{\alpha_1\alpha_2-\gamma_1\gamma_2},\frac{\alpha_1\alpha-\gamma_1\beta}{\alpha_1\alpha_2-\gamma_1\gamma_2}\right),\left(\frac{\alpha_2\beta-\gamma_2\beta}{\alpha_1\alpha_2-\gamma_1\gamma_2},\frac{\alpha_1\beta-\beta\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}\right),\left(\frac{\beta\alpha_2-\gamma_2\gamma}{\alpha_1\alpha_2-\gamma_1\gamma_2},\frac{-\beta\gamma_1+\alpha_1\gamma}{\alpha_1\alpha_2-\gamma_1\gamma_2}\right),\\ \left(\frac{-\gamma_2\alpha+\alpha_2\gamma}{\alpha_1\alpha_2-\gamma_1\gamma_2},\frac{\alpha_1\alpha-\gamma_1\gamma}{\alpha_1\alpha_2-\gamma_1\gamma_2}\right),\left(\frac{-\gamma_2\beta+\alpha_2\gamma}{\alpha_1\alpha_2-\gamma_1\gamma_2},\frac{\alpha_1\beta-\gamma_1\gamma}{\alpha_1\alpha_2-\gamma_1\gamma_2}\right),\left(\frac{\alpha_2\gamma-\gamma_2\gamma}{\alpha_1\alpha_2-\gamma_1\gamma_2},\frac{\alpha_1\gamma-\gamma_1\gamma}{\alpha_1\alpha_2-\gamma_1\gamma_2}\right)\end{array}\right\},$$

$S^{-1}X_1S=\alpha_1 I_{n_1}\oplus\gamma_1 I_{n_2}$, $S^{-1}X_2S=\gamma_2 I_{n_1}\oplus\alpha_2 I_{n_2}$ ve $\alpha_1\alpha_2-\gamma_1\gamma_2\neq 0$,

$$29)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\beta_2\alpha-\alpha\gamma_2}{\alpha_1\beta_2-\gamma_1\gamma_2},\frac{\alpha_1\alpha-\alpha\beta_1}{\alpha_1\beta_2-\gamma_1\gamma_2}\right),\left(\frac{\beta_2\alpha-\gamma_2\beta}{\alpha_1\beta_2-\gamma_1\gamma_2},\frac{\alpha_1\beta-\alpha\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}\right),\left(\frac{\beta_2\alpha-\gamma_2\gamma}{\alpha_1\beta_2-\gamma_1\gamma_2},\frac{\alpha_1\gamma-\alpha\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}\right),\\ \left(\frac{-\gamma_2\alpha+\beta\beta_2}{\alpha_1\beta_2-\gamma_1\gamma_2},\frac{\alpha_1\alpha-\gamma_1\beta}{\alpha_1\beta_2-\gamma_1\gamma_2}\right),\left(\frac{\beta_2\beta-\gamma_2\beta}{\alpha_1\beta_2-\gamma_1\gamma_2},\frac{\alpha_1\beta-\beta\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}\right),\left(\frac{\beta\beta_2-\gamma_2\gamma}{\alpha_1\beta_2-\gamma_1\gamma_2},\frac{-\beta\gamma_1+\alpha_1\gamma}{\alpha_1\beta_2-\gamma_1\gamma_2}\right),\\ \left(\frac{-\gamma_2\alpha+\beta_2\gamma}{\alpha_1\beta_2-\gamma_1\gamma_2},\frac{\alpha_1\alpha-\gamma_1\gamma}{\alpha_1\beta_2-\gamma_1\gamma_2}\right),\left(\frac{-\gamma_2\beta+\beta_2\gamma}{\alpha_1\beta_2-\gamma_1\gamma_2},\frac{\alpha_1\beta-\gamma_1\gamma}{\alpha_1\beta_2-\gamma_1\gamma_2}\right),\left(\frac{\beta_2\gamma-\gamma_2\gamma}{\alpha_1\beta_2-\gamma_1\gamma_2},\frac{\alpha_1\gamma-\gamma_1\gamma}{\alpha_1\beta_2-\gamma_1\gamma_2}\right)\end{array}\right\},$$

$S^{-1}X_1S=\alpha_1 I_{n_1}\oplus\gamma_1 I_{n_2}$, $S^{-1}X_2S=\gamma_2 I_{n_1}\oplus\beta_2 I_{n_2}$ ve $\alpha_1\beta_2-\gamma_1\gamma_2\neq 0$,

$$30)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha-\beta}{\alpha_1-\gamma_1},\frac{\alpha\gamma_1-\alpha_1\beta}{\gamma_2(-\alpha_1+\gamma_1)}\right),\left(\frac{\alpha-\gamma}{\alpha_1-\gamma_1},\frac{-\alpha\gamma_1+\alpha_1\gamma}{\gamma_2(\alpha_1-\gamma_1)}\right),\left(\frac{\beta-\alpha}{\alpha_1-\gamma_1},\frac{\alpha_1\alpha-\beta\gamma_1}{\gamma_2(\alpha_1-\gamma_1)}\right),\\ \left(\frac{\beta-\gamma}{\alpha_1-\gamma_1},\frac{-\beta\gamma_1+\alpha_1\gamma}{\gamma_2(\alpha_1-\gamma_1)}\right),\left(\frac{\gamma-\alpha}{\alpha_1-\gamma_1},\frac{\alpha_1\alpha-\gamma_1\gamma}{\gamma_2(\alpha_1-\gamma_1)}\right),\left(\frac{\gamma-\beta}{\alpha_1-\gamma_1},\frac{\alpha_1\beta-\gamma_1\gamma}{\gamma_2(\alpha_1-\gamma_1)}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\alpha_1I_{n_1}\oplus\gamma_1I_{n_2},\ S^{-1}X_2S=\gamma_2I_{n_1}\oplus\gamma_2I_{n_2},\ \gamma_2\neq 0 \text{ ve } \alpha_1-\gamma_1\neq 0,$$

$$31)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\alpha\beta_2+\alpha_2\beta}{\beta_1(\alpha_2-\beta_2)},\frac{\alpha-\beta}{\alpha_2-\beta_2}\right),\left(\frac{-\alpha\beta_2+\alpha_2\gamma}{\beta_1(\alpha_2-\beta_2)},\frac{\alpha-\gamma}{\alpha_2-\beta_2}\right),\left(\frac{\alpha_2\alpha-\beta_2\beta}{\beta_1(\alpha_2-\beta_2)},\frac{\beta-\alpha}{\alpha_2-\beta_2}\right),\\ \left(\frac{-\beta_2\beta+\alpha_2\gamma}{\beta_1(\alpha_2-\beta_2)},\frac{\beta-\gamma}{\alpha_2-\beta_2}\right),\left(\frac{\alpha_2\alpha-\beta_2\gamma}{\beta_1(\alpha_2-\beta_2)},\frac{\gamma-\alpha}{\alpha_2-\beta_2}\right),\left(\frac{\alpha_2\beta-\beta_2\gamma}{\beta_1(\alpha_2-\beta_2)},\frac{\gamma-\beta}{\alpha_2-\beta_2}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\beta_1I_{n_1}\oplus\beta_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\beta_2I_{n_2},\ \beta_1\neq 0 \text{ ve } \alpha_2-\beta_2\neq 0,$$

$$32)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\alpha\gamma_2+\alpha_2\beta}{\beta_1(\alpha_2-\gamma_2)},\frac{\alpha-\beta}{\alpha_2-\gamma_2}\right),\left(\frac{-\alpha\gamma_2+\alpha_2\gamma}{\beta_1(\alpha_2-\gamma_2)},\frac{\alpha-\gamma}{\alpha_2-\gamma_2}\right),\left(\frac{\alpha_2\alpha-\gamma_2\beta}{\beta_1(\alpha_2-\gamma_2)},\frac{\beta-\alpha}{\alpha_2-\gamma_2}\right),\\ \left(\frac{-\gamma_2\beta+\alpha_2\gamma}{\beta_1(\alpha_2-\gamma_2)},\frac{\beta-\gamma}{\alpha_2-\gamma_2}\right),\left(\frac{\alpha_2\alpha-\gamma_2\gamma}{\beta_1(\alpha_2-\gamma_2)},\frac{\gamma-\alpha}{\alpha_2-\gamma_2}\right),\left(\frac{\alpha_2\beta-\gamma_2\gamma}{\beta_1(\alpha_2-\gamma_2)},\frac{\gamma-\beta}{\alpha_2-\gamma_2}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\beta_1I_{n_1}\oplus\beta_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\gamma_2I_{n_2},\ \beta_1\neq 0 \text{ ve } \alpha_2-\gamma_2\neq 0,$$

$$33)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha-\beta}{\beta_1-\gamma_1},\frac{\alpha\gamma_1-\beta_1\beta}{\alpha_2(-\beta_1+\gamma_1)}\right),\left(\frac{\alpha-\gamma}{\beta_1-\gamma_1},\frac{-\alpha\gamma_1+\beta_1\gamma}{\alpha_2(\beta_1-\gamma_1)}\right),\left(\frac{\beta-\alpha}{\beta_1-\gamma_1},\frac{\beta_1\alpha-\beta\gamma_1}{\alpha_2(\beta_1-\gamma_1)}\right),\\ \left(\frac{\beta-\gamma}{\beta_1-\gamma_1},\frac{-\beta\gamma_1+\beta_1\gamma}{\alpha_2(\beta_1-\gamma_1)}\right),\left(\frac{\gamma-\alpha}{\beta_1-\gamma_1},\frac{\beta_1\alpha-\gamma_1\gamma}{\alpha_2(\beta_1-\gamma_1)}\right),\left(\frac{\gamma-\beta}{\beta_1-\gamma_1},\frac{\beta_1\beta-\gamma_1\gamma}{\alpha_2(\beta_1-\gamma_1)}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\beta_1I_{n_1}\oplus\gamma_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\alpha_2I_{n_2},\ \alpha_2\neq 0 \text{ ve } \beta_1-\gamma_1\neq 0,$$

$$34)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\alpha_2\alpha+\alpha\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1},\frac{\beta_1\alpha-\alpha\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{\alpha\beta_2-\alpha_2\beta}{\beta_1\beta_2-\alpha_2\gamma_1},\frac{\beta_1\beta-\alpha\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{\alpha\beta_2-\alpha_2\gamma}{\beta_1\beta_2-\alpha_2\gamma_1},\frac{\beta_1\gamma-\alpha\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}\right),\\ \left(\frac{-\alpha_2\alpha+\beta\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\beta}{\beta_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\beta+\beta_2\beta}{\beta_1\beta_2-\alpha_2\gamma_1},\frac{\beta_1\beta-\beta\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{\beta\beta_2-\alpha_2\gamma}{\beta_1\beta_2-\alpha_2\gamma_1},\frac{-\beta\gamma_1+\beta_1\gamma}{\beta_1\beta_2-\alpha_2\gamma_1}\right),\\ \left(\frac{-\alpha_2\alpha+\beta_2\gamma}{\beta_1\beta_2-\alpha_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\gamma}{\beta_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\beta+\beta_2\gamma}{\beta_1\beta_2-\alpha_2\gamma_1},\frac{\beta_1\beta-\gamma_1\gamma}{\beta_1\beta_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\gamma+\beta_2\gamma}{\beta_1\beta_2-\alpha_2\gamma_1},\frac{\beta_1\gamma-\gamma_1\gamma}{\beta_1\beta_2-\alpha_2\gamma_1}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\beta_1I_{n_1}\oplus\gamma_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\beta_2I_{n_2} \text{ ve } \beta_1\beta_2-\alpha_2\gamma_1\neq 0,$$

$$35)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\alpha_2\alpha+\alpha\gamma_2}{\beta_1\gamma_2-\alpha_2\gamma_1},\frac{\beta_1\alpha-\alpha\gamma_1}{\beta_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{\alpha\gamma_2-\alpha_2\beta}{\beta_1\gamma_2-\alpha_2\gamma_1},\frac{\beta_1\beta-\alpha\gamma_1}{\beta_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{\alpha\gamma_2-\alpha_2\gamma}{\beta_1\gamma_2-\alpha_2\gamma_1},\frac{\beta_1\gamma-\alpha\gamma_1}{\beta_1\gamma_2-\alpha_2\gamma_1}\right),\\ \left(\frac{-\alpha_2\alpha+\beta\gamma_2}{\beta_1\gamma_2-\alpha_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\beta}{\beta_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\beta+\gamma_2\beta}{\beta_1\gamma_2-\alpha_2\gamma_1},\frac{\beta_1\beta-\beta\gamma_1}{\beta_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{\beta\gamma_2-\alpha_2\gamma}{\beta_1\gamma_2-\alpha_2\gamma_1},\frac{-\beta\gamma_1+\beta_1\gamma}{\beta_1\gamma_2-\alpha_2\gamma_1}\right),\\ \left(\frac{-\alpha_2\alpha+\gamma_2\gamma}{\beta_1\gamma_2-\alpha_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\gamma}{\beta_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\beta+\gamma_2\gamma}{\beta_1\gamma_2-\alpha_2\gamma_1},\frac{\beta_1\beta-\gamma_1\gamma}{\beta_1\gamma_2-\alpha_2\gamma_1}\right),\left(\frac{-\alpha_2\gamma+\gamma_2\gamma}{\beta_1\gamma_2-\alpha_2\gamma_1},\frac{\beta_1\gamma-\gamma_1\gamma}{\beta_1\gamma_2-\alpha_2\gamma_1}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\beta_1I_{n_1}\oplus\gamma_1I_{n_2},\ S^{-1}X_2S=\alpha_2I_{n_1}\oplus\gamma_2I_{n_2} \text{ ve } \beta_1\gamma_2-\alpha_2\gamma_1\neq 0,$$

$$36)\ (c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{-\alpha\gamma_2+\beta_2\beta}{\beta_1(\beta_2-\gamma_2)},\frac{\alpha-\beta}{\beta_2-\gamma_2}\right),\left(\frac{-\alpha\gamma_2+\beta_2\gamma}{\beta_1(\beta_2-\gamma_2)},\frac{\alpha-\gamma}{\beta_2-\gamma_2}\right),\left(\frac{\beta_2\alpha-\gamma_2\beta}{\beta_1(\beta_2-\gamma_2)},\frac{\beta-\alpha}{\beta_2-\gamma_2}\right),\\ \left(\frac{-\gamma_2\beta+\beta_2\gamma}{\beta_1(\beta_2-\gamma_2)},\frac{\beta-\gamma}{\beta_2-\gamma_2}\right),\left(\frac{\beta_2\alpha-\gamma_2\gamma}{\beta_1(\beta_2-\gamma_2)},\frac{\gamma-\alpha}{\beta_2-\gamma_2}\right),\left(\frac{\beta_2\beta-\gamma_2\gamma}{\beta_1(\beta_2-\gamma_2)},\frac{\gamma-\beta}{\beta_2-\gamma_2}\right)\end{array}\right\},$$

$$S^{-1}X_1S=\beta_1I_{n_1}\oplus\beta_1I_{n_2},\ S^{-1}X_2S=\beta_2I_{n_1}\oplus\gamma_2I_{n_2},\ \beta_1\neq 0 \text{ ve } \beta_2-\gamma_2\neq 0,$$

37) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha_2\alpha-\alpha\beta_2}{\beta_1\alpha_2-\beta_2\gamma_1},\frac{\beta_1\alpha-\alpha\gamma_1}{\beta_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{\alpha_2\alpha-\beta_2\beta}{\beta_1\alpha_2-\beta_2\gamma_1},\frac{-\alpha\gamma_1+\beta_1\beta}{\beta_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{\alpha_2\alpha-\beta_2\gamma}{\beta_1\alpha_2-\beta_2\gamma_1},\frac{\beta_1\gamma-\alpha\gamma_1}{\beta_1\alpha_2-\beta_2\gamma_1}\right),\\ \left(\frac{-\beta_2\alpha+\beta\alpha_2}{\beta_1\alpha_2-\beta_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\beta}{\beta_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{\alpha_2\beta-\beta_2\beta}{\beta_1\alpha_2-\beta_2\gamma_1},\frac{\beta_1\beta-\beta\gamma_1}{\beta_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{\beta\alpha_2-\beta_2\gamma}{\beta_1\alpha_2-\beta_2\gamma_1},\frac{-\beta\gamma_1+\beta_1\gamma}{\beta_1\alpha_2-\beta_2\gamma_1}\right),\\ \left(\frac{-\beta_2\alpha+\alpha_2\gamma}{\beta_1\alpha_2-\beta_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\gamma}{\beta_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{-\beta_2\beta+\alpha_2\gamma}{\beta_1\alpha_2-\beta_2\gamma_1},\frac{\beta_1\beta-\gamma_1\gamma}{\beta_1\alpha_2-\beta_2\gamma_1}\right),\left(\frac{\alpha_2\gamma-\beta_2\gamma}{\beta_1\alpha_2-\beta_2\gamma_1},\frac{\beta_1\gamma-\gamma_1\gamma}{\beta_1\alpha_2-\beta_2\gamma_1}\right)\end{array}\right\},$

$S^{-1}X_1S=\beta_1I_{n_1}\oplus\gamma_1I_{n_2}$, $S^{-1}X_2S=\beta_2I_{n_1}\oplus\alpha_2I_{n_2}$ ve $\beta_1\alpha_2-\beta_2\gamma_1\neq 0$,

38) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha-\beta}{\beta_1-\gamma_1},\frac{\beta_1\beta-\alpha\gamma_1}{\beta_2(\beta_1-\gamma_1)}\right),\left(\frac{\alpha-\gamma}{\beta_1-\gamma_1},\frac{-\alpha\gamma_1+\beta_1\gamma}{\beta_2(\beta_1-\gamma_1)}\right),\left(\frac{\beta-\alpha}{\beta_1-\gamma_1},\frac{\beta_1\alpha-\beta\gamma_1}{\beta_2(\beta_1-\gamma_1)}\right),\\ \left(\frac{\beta-\gamma}{\beta_1-\gamma_1},\frac{-\beta\gamma_1+\beta_1\gamma}{\beta_2(\beta_1-\gamma_1)}\right),\left(\frac{\gamma-\alpha}{\beta_1-\gamma_1},\frac{\beta_1\alpha-\gamma_1\gamma}{\beta_2(\beta_1-\gamma_1)}\right),\left(\frac{\gamma-\beta}{\beta_1-\gamma_1},\frac{\beta_1\beta-\gamma_1\gamma}{\beta_2(\beta_1-\gamma_1)}\right)\end{array}\right\},$

$S^{-1}X_1S=\beta_1I_{n_1}\oplus\gamma_1I_{n_2}$, $S^{-1}X_2S=\beta_2I_{n_1}\oplus\beta_2I_{n_2}$, $\beta_2\neq 0$ ve $\beta_1-\gamma_1\neq 0$,

39) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\gamma_2\alpha-\alpha\beta_2}{\beta_1\gamma_2-\beta_2\gamma_1},\frac{\beta_1\alpha-\alpha\gamma_1}{\beta_1\gamma_2-\beta_2\gamma_1}\right),\left(\frac{\gamma_2\alpha-\beta_2\beta}{\beta_1\gamma_2-\beta_2\gamma_1},\frac{-\alpha\gamma_1+\beta_1\beta}{\beta_1\gamma_2-\beta_2\gamma_1}\right),\left(\frac{\gamma_2\alpha-\beta_2\gamma}{\beta_1\gamma_2-\beta_2\gamma_1},\frac{\beta_1\gamma-\alpha\gamma_1}{\beta_1\gamma_2-\beta_2\gamma_1}\right),\\ \left(\frac{-\beta_2\alpha+\beta\gamma_2}{\beta_1\gamma_2-\beta_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\beta}{\beta_1\gamma_2-\beta_2\gamma_1}\right),\left(\frac{\gamma_2\beta-\beta_2\beta}{\beta_1\gamma_2-\beta_2\gamma_1},\frac{\beta_1\beta-\beta\gamma_1}{\beta_1\gamma_2-\beta_2\gamma_1}\right),\left(\frac{\beta\gamma_2-\beta_2\gamma}{\beta_1\gamma_2-\beta_2\gamma_1},\frac{-\beta\gamma_1+\beta_1\gamma}{\beta_1\gamma_2-\beta_2\gamma_1}\right),\\ \left(\frac{-\beta_2\alpha+\gamma_2\gamma}{\beta_1\gamma_2-\beta_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\gamma}{\beta_1\gamma_2-\beta_2\gamma_1}\right),\left(\frac{-\beta_2\beta+\gamma_2\gamma}{\beta_1\gamma_2-\beta_2\gamma_1},\frac{\beta_1\beta-\gamma_1\gamma}{\beta_1\gamma_2-\beta_2\gamma_1}\right),\left(\frac{\gamma_2\gamma-\beta_2\gamma}{\beta_1\gamma_2-\beta_2\gamma_1},\frac{\beta_1\gamma-\gamma_1\gamma}{\beta_1\gamma_2-\beta_2\gamma_1}\right)\end{array}\right\},$

$S^{-1}X_1S=\beta_1I_{n_1}\oplus\gamma_1I_{n_2}$, $S^{-1}X_2S=\beta_2I_{n_1}\oplus\gamma_2I_{n_2}$ ve $\beta_1\gamma_2-\beta_2\gamma_1\neq 0$,

40) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha_2\alpha-\alpha\gamma_2}{\beta_1\alpha_2-\gamma_2\gamma_1},\frac{\beta_1\alpha-\alpha\gamma_1}{\beta_1\alpha_2-\gamma_2\gamma_1}\right),\left(\frac{\alpha_2\alpha-\gamma_2\beta}{\beta_1\alpha_2-\gamma_2\gamma_1},\frac{-\alpha\gamma_1+\beta_1\beta}{\beta_1\alpha_2-\gamma_2\gamma_1}\right),\left(\frac{\alpha_2\alpha-\gamma_2\gamma}{\beta_1\alpha_2-\gamma_2\gamma_1},\frac{\beta_1\gamma-\alpha\gamma_1}{\beta_1\alpha_2-\gamma_2\gamma_1}\right),\\ \left(\frac{-\gamma_2\alpha+\beta\alpha_2}{\beta_1\alpha_2-\gamma_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\beta}{\beta_1\alpha_2-\gamma_2\gamma_1}\right),\left(\frac{\alpha_2\beta-\gamma_2\beta}{\beta_1\alpha_2-\gamma_2\gamma_1},\frac{\beta_1\beta-\beta\gamma_1}{\beta_1\alpha_2-\gamma_2\gamma_1}\right),\left(\frac{\beta\alpha_2-\gamma_2\gamma}{\beta_1\alpha_2-\gamma_2\gamma_1},\frac{-\beta\gamma_1+\beta_1\gamma}{\beta_1\alpha_2-\gamma_2\gamma_1}\right),\\ \left(\frac{-\gamma_2\alpha+\alpha_2\gamma}{\beta_1\alpha_2-\gamma_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\gamma}{\beta_1\alpha_2-\gamma_2\gamma_1}\right),\left(\frac{-\gamma_2\beta+\alpha_2\gamma}{\beta_1\alpha_2-\gamma_2\gamma_1},\frac{\beta_1\beta-\gamma_1\gamma}{\beta_1\alpha_2-\gamma_2\gamma_1}\right),\left(\frac{\alpha_2\gamma-\gamma_2\gamma}{\beta_1\alpha_2-\gamma_2\gamma_1},\frac{\beta_1\gamma-\gamma_1\gamma}{\beta_1\alpha_2-\gamma_2\gamma_1}\right)\end{array}\right\},$

$S^{-1}X_1S=\beta_1I_{n_1}\oplus\gamma_1I_{n_2}$, $S^{-1}X_2S=\gamma_2I_{n_1}\oplus\alpha_2I_{n_2}$ ve $\beta_1\alpha_2-\gamma_2\gamma_1\neq 0$,

41) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\beta_2\alpha-\alpha\gamma_2}{\beta_1\beta_2-\gamma_2\gamma_1},\frac{\beta_1\alpha-\alpha\gamma_1}{\beta_1\beta_2-\gamma_2\gamma_1}\right),\left(\frac{\beta_2\alpha-\gamma_2\beta}{\beta_1\beta_2-\gamma_2\gamma_1},\frac{-\alpha\gamma_1+\beta_1\beta}{\beta_1\beta_2-\gamma_2\gamma_1}\right),\left(\frac{\beta_2\alpha-\gamma_2\gamma}{\beta_1\beta_2-\gamma_2\gamma_1},\frac{\beta_1\gamma-\alpha\gamma_1}{\beta_1\beta_2-\gamma_2\gamma_1}\right),\\ \left(\frac{-\gamma_2\alpha+\beta\beta_2}{\beta_1\beta_2-\gamma_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\beta}{\beta_1\beta_2-\gamma_2\gamma_1}\right),\left(\frac{\beta_2\beta-\gamma_2\beta}{\beta_1\beta_2-\gamma_2\gamma_1},\frac{\beta_1\beta-\beta\gamma_1}{\beta_1\beta_2-\gamma_2\gamma_1}\right),\left(\frac{\beta\beta_2-\gamma_2\gamma}{\beta_1\beta_2-\gamma_2\gamma_1},\frac{-\beta\gamma_1+\beta_1\gamma}{\beta_1\beta_2-\gamma_2\gamma_1}\right),\\ \left(\frac{-\gamma_2\alpha+\beta_2\gamma}{\beta_1\beta_2-\gamma_2\gamma_1},\frac{\beta_1\alpha-\gamma_1\gamma}{\beta_1\beta_2-\gamma_2\gamma_1}\right),\left(\frac{-\gamma_2\beta+\beta_2\gamma}{\beta_1\beta_2-\gamma_2\gamma_1},\frac{\beta_1\beta-\gamma_1\gamma}{\beta_1\beta_2-\gamma_2\gamma_1}\right),\left(\frac{\beta_2\gamma-\gamma_2\gamma}{\beta_1\beta_2-\gamma_2\gamma_1},\frac{\beta_1\gamma-\gamma_1\gamma}{\beta_1\beta_2-\gamma_2\gamma_1}\right)\end{array}\right\},$

$S^{-1}X_1S=\beta_1I_{n_1}\oplus\gamma_1I_{n_2}$, $S^{-1}X_2S=\gamma_2I_{n_1}\oplus\beta_2I_{n_2}$ ve $\beta_1\beta_2-\gamma_2\gamma_1\neq 0$,

42) $(c_1,c_2)\in\left\{\begin{array}{l}\left(\frac{\alpha-\beta}{\beta_1-\gamma_1},\frac{\beta_1\beta-\alpha\gamma_1}{\gamma_2(\beta_1-\gamma_1)}\right),\left(\frac{\alpha-\gamma}{\beta_1-\gamma_1},\frac{-\alpha\gamma_1+\beta_1\gamma}{\gamma_2(\beta_1-\gamma_1)}\right),\left(\frac{\beta-\alpha}{\beta_1-\gamma_1},\frac{\beta_1\alpha-\beta\gamma_1}{\gamma_2(\beta_1-\gamma_1)}\right),\\ \left(\frac{\beta-\gamma}{\beta_1-\gamma_1},\frac{-\beta\gamma_1+\beta_1\gamma}{\gamma_2(\beta_1-\gamma_1)}\right),\left(\frac{\gamma-\alpha}{\beta_1-\gamma_1},\frac{\beta_1\alpha-\gamma_1\gamma}{\gamma_2(\beta_1-\gamma_1)}\right),\left(\frac{\gamma-\beta}{\beta_1-\gamma_1},\frac{\beta_1\beta-\gamma_1\gamma}{\gamma_2(\beta_1-\gamma_1)}\right)\end{array}\right\},$

$S^{-1}X_1S=\beta_1I_{n_1}\oplus\gamma_1I_{n_2}$, $S^{-1}X_2S=\gamma_2I_{n_1}\oplus\gamma_2I_{n_2}$, $\gamma_2\neq 0$ ve $\beta_1-\gamma_1\neq 0$,

$$43)\ (c_1,c_2)\in\left\{\begin{matrix}\left(\frac{-\alpha\beta_2+\alpha_2\beta}{\gamma_1(\alpha_2-\beta_2)},\frac{\alpha-\beta}{\alpha_2-\beta_2}\right),\left(\frac{-\alpha\beta_2+\alpha_2\gamma}{\gamma_1(\alpha_2-\beta_2)},\frac{\alpha-\gamma}{\alpha_2-\beta_2}\right),\left(\frac{\alpha_2\alpha-\beta_2\beta}{\gamma_1(\alpha_2-\beta_2)},\frac{\beta-\alpha}{\alpha_2-\beta_2}\right),\\ \left(\frac{-\beta_2\beta+\alpha_2\gamma}{\gamma_1(\alpha_2-\beta_2)},\frac{\beta-\gamma}{\alpha_2-\beta_2}\right),\left(\frac{\alpha_2\alpha-\beta_2\gamma}{\gamma_1(\alpha_2-\beta_2)},\frac{\gamma-\alpha}{\alpha_2-\beta_2}\right),\left(\frac{\alpha_2\beta-\beta_2\gamma}{\gamma_1(\alpha_2-\beta_2)},\frac{\gamma-\beta}{\alpha_2-\beta_2}\right)\end{matrix}\right\},$$

$$S^{-1}X_1S=\gamma_1 I_{n_1}\oplus\gamma_1 I_{n_2},\ S^{-1}X_2S=\alpha_2 I_{n_1}\oplus\beta_2 I_{n_2},\ \gamma_1\neq 0 \text{ ve } \alpha_2-\beta_2\neq 0,$$

$$44)\ (c_1,c_2)\in\left\{\begin{matrix}\left(\frac{-\alpha\gamma_2+\alpha_2\beta}{\gamma_1(\alpha_2-\gamma_2)},\frac{\alpha-\beta}{\alpha_2-\gamma_2}\right),\left(\frac{-\alpha\gamma_2+\alpha_2\gamma}{\gamma_1(\alpha_2-\gamma_2)},\frac{\alpha-\gamma}{\alpha_2-\gamma_2}\right),\left(\frac{\alpha_2\alpha-\gamma_2\beta}{\gamma_1(\alpha_2-\gamma_2)},\frac{\beta-\alpha}{\alpha_2-\gamma_2}\right),\\ \left(\frac{-\gamma_2\beta+\alpha_2\gamma}{\gamma_1(\alpha_2-\gamma_2)},\frac{\beta-\gamma}{\alpha_2-\gamma_2}\right),\left(\frac{\alpha_2\alpha-\gamma_2\gamma}{\gamma_1(\alpha_2-\gamma_2)},\frac{\gamma-\alpha}{\alpha_2-\gamma_2}\right),\left(\frac{\alpha_2\beta-\gamma_2\gamma}{\gamma_1(\alpha_2-\gamma_2)},\frac{\gamma-\beta}{\alpha_2-\gamma_2}\right)\end{matrix}\right\},$$

$$S^{-1}X_1S=\gamma_1 I_{n_1}\oplus\gamma_1 I_{n_2},\ S^{-1}X_2S=\alpha_2 I_{n_1}\oplus\gamma_2 I_{n_2},\ \gamma_1\neq 0 \text{ ve } \alpha_2-\gamma_2\neq 0,$$

$$45)\ (c_1,c_2)\in\left\{\begin{matrix}\left(\frac{-\alpha\gamma_2+\beta_2\beta}{\gamma_1(\beta_2-\gamma_2)},\frac{\alpha-\beta}{\beta_2-\gamma_2}\right),\left(\frac{-\alpha\gamma_2+\beta_2\gamma}{\gamma_1(\beta_2-\gamma_2)},\frac{\alpha-\gamma}{\beta_2-\gamma_2}\right),\left(\frac{\beta_2\alpha-\gamma_2\beta}{\gamma_1(\beta_2-\gamma_2)},\frac{\beta-\alpha}{\beta_2-\gamma_2}\right),\\ \left(\frac{-\gamma_2\beta+\beta_2\gamma}{\gamma_1(\beta_2-\gamma_2)},\frac{\beta-\gamma}{\beta_2-\gamma_2}\right),\left(\frac{\beta_2\alpha-\gamma_2\gamma}{\gamma_1(\beta_2-\gamma_2)},\frac{\gamma-\alpha}{\beta_2-\gamma_2}\right),\left(\frac{\beta_2\beta-\gamma_2\gamma}{\gamma_1(\beta_2-\gamma_2)},\frac{\gamma-\beta}{\beta_2-\gamma_2}\right)\end{matrix}\right\},$$

$$S^{-1}X_1S=\gamma_1 I_{n_1}\oplus\gamma_1 I_{n_2},\ S^{-1}X_2S=\beta_2 I_{n_1}\oplus\gamma_2 I_{n_2},\ \gamma_1\neq 0 \text{ ve } \beta_2-\gamma_2\neq 0,$$

4.3. Değişmeli İki Kuadripotent Matrisin Lineer Bileşiminin Kuadripotentliği

Bu kısımda değişmeli iki kuadripotent matrisin lineer bileşiminin kuadripotentliğinin karakterizasyonu problemi geliştirilen Algoritma 3.1 ile çözülecektir.

$X_i\in\mathbb{C}_n$, $i=1,2$, olmak üzere $X_i^4=X_i$ ve $X_1X_2=X_2X_1$ olsun. Bu durumda $c_1,c_2\in\mathbb{C}\setminus\{0\}$ olmak üzere

$$c_1X_1+c_2X_2=X \tag{4.2}$$

lineer bileşim matrisinin kuadripotentliğinin karakterizasyonu problemi, diğer bir deyişle $\sigma(X_i)\subseteq\left\{-\frac{1}{2}+\frac{i\sqrt{3}}{2},-\frac{1}{2}-\frac{i\sqrt{3}}{2},1,0\right\}$ olacak biçimdeki X_i, $i=1,2$, matrislerinin (4.2) ile verilen X lineer bileşim matrisi, ne zaman $\sigma(X)\subseteq\left\{-\frac{1}{2}+\frac{i\sqrt{3}}{2},-\frac{1}{2}-\frac{i\sqrt{3}}{2},1,0\right\}$ olacak biçimde bir matris olur problemini ele alalım. Teorem 2.40'dan X_i, $i=1,2$, kuadripotent matrislerinin köşegenleştirilebilir oldukları ve Teorem 2.31'dan eşzamanlı köşegenleştirilebilir oldukları bilinmektedir.

(4.2) lineer bileşim matrisinin kuadripotent olmasının gerekli ve yeterli koşulunun

$$\left(c_1^4-c_1\right)X_1+4c_1^3c_2X_1^3X_2+6c_1^2c_2^2X_1^2X_2^2+4c_1c_2^3X_1X_2^3+\left(c_2^4-c_2\right)X_2=\mathbf{0} \tag{4.3}$$

olduğu doğrudan hesaplamayla görülür. Çözüm kümesinde parametrik çözüm bulunmayan, yani çözüm kümesinde sonlu tane eleman olan sonuçlarda, matrisler ile ilgili şartlar, çözüm kümesinin ilk çözümü, eğer bu daha önce kullanıldıysa ikinci çözümü, bu da daha önce kullanıldıysa üçüncü çözümü ve bu şekilde devam ederek, ilgili çözümün (4.3) lineer bileşiminde yerine koyulmasıyla elde edilmektedir.

Teorem 4.2. $X_1, X_2 \in \mathbb{C}_n$ matrisleri iki değişmeli kuadripotent matris ve $c_1, c_2 \in \mathbb{C}\setminus\{0\}$ olsun. Bu durumda, $c_1X_1+c_2X_2$ lineer bileşim matrisinin kuadripotent olmasının gerekli ve yeterli koşulu, $j \neq k$ ve $j,k=1,2$ olmak üzere, aşağıdaki şartlardan birinin sağlanmasıdır:

1) $c_1+c_2 \in \left\{-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}, -\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}, 1, 0\right\}$ ve $X_1 = X_2$,

2) $c_1+\left(-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\right)c_2 \in \left\{-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}, -\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}, 1, 0\right\}$ ve $\left(-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\right)X_1 = X_2$,

3) $c_1+\left(-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\right)c_2 \in \left\{-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}, -\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}, 1, 0\right\}$ ve $\left(-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\right)X_1 = X_2$,

4) $\left(c_j, c_k\right) \in \left\{\begin{array}{l} \left(\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}, \tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\right), \left(\tfrac{1}{2}-\tfrac{i\sqrt{3}}{6}, \tfrac{1}{2}+\tfrac{i\sqrt{3}}{6}\right), \left(\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}, -1\right), \left(\tfrac{i}{\sqrt{3}}, -\tfrac{1}{2}+\tfrac{i\sqrt{3}}{6}\right), \left(-1, \tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\right), \\ \left(-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{6}, -\tfrac{i}{\sqrt{3}}\right), \left(\tfrac{1}{2}+\tfrac{i\sqrt{3}}{6}, -\tfrac{1}{2}-\tfrac{i\sqrt{3}}{6}\right), \left(-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{6}, \tfrac{1}{2}-\tfrac{i\sqrt{3}}{6}\right), \left(-\tfrac{i}{\sqrt{3}}, \tfrac{i}{\sqrt{3}}\right) \end{array}\right\}$

ve $\left(-1+i\sqrt{3}\right)X_j+\left(-2-2i\sqrt{3}\right)X_j^3X_k+6X_j^2X_k^2+\left(-2+2i\sqrt{3}\right)X_jX_k^3+\left(-1-i\sqrt{3}\right)X_k=\mathbf{0}$,

5) $\left(c_j, c_k\right) \in \left\{\begin{array}{l} \left(-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}, \tfrac{3}{2}-\tfrac{i\sqrt{3}}{2}\right), \left(-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}, \tfrac{3}{2}+\tfrac{i\sqrt{3}}{2}\right), \left(1, -\tfrac{3}{2}+\tfrac{i\sqrt{3}}{2}\right), \left(-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{6}, i\sqrt{3}\right), \left(1, -\tfrac{3}{2}-\tfrac{i\sqrt{3}}{2}\right), \\ \left(-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}, -i\sqrt{3}\right), (1,-1), \left(-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}, \tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\right), \left(-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}, \tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\right) \end{array}\right\}$

ve $\left(6-2i\sqrt{3}\right)X_j^3X_k-18X_j^2X_k^2+\left(18+6i\sqrt{3}\right)X_jX_k^3+\left(-6-4i\sqrt{3}\right)X_k=\mathbf{0}$,

6) $c_1+c_2 \in \left\{-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}, -\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}, 1, 0\right\}$ ve $X_1 = X_2$,

7) $\left(c_j, c_k\right) \in \left\{ \begin{array}{l} \left(\frac{1}{2}-\frac{i\sqrt{3}}{2}, \frac{1}{2}-\frac{i\sqrt{3}}{2}\right), \left(\frac{1}{2}-\frac{i\sqrt{3}}{6}, -\frac{i}{\sqrt{3}}\right), \left(\frac{1}{2}+\frac{i\sqrt{3}}{2}, \frac{1}{2}+\frac{i\sqrt{3}}{2}\right), \left(\frac{i}{\sqrt{3}}, \frac{1}{2}+\frac{i\sqrt{3}}{6}\right), \left(-1,-1\right), \\ \left(-\frac{1}{2}-\frac{i\sqrt{3}}{6}, -\frac{1}{2}+\frac{i\sqrt{3}}{6}\right), \left(\frac{1}{2}+\frac{i\sqrt{3}}{6}, \frac{i}{\sqrt{3}}\right), \left(-\frac{1}{2}+\frac{i\sqrt{3}}{6}, -\frac{1}{2}-\frac{i\sqrt{3}}{6}\right), \left(-\frac{i}{\sqrt{3}}, \frac{1}{2}-\frac{i\sqrt{3}}{6}\right) \end{array} \right\}$ ve

$$\left(-1+i\sqrt{3}\right)X_j + \left(-2+2i\sqrt{3}\right)X_j^3X_k + \left(-3+3i\sqrt{3}\right)X_j^2X_k^2 + \left(-2+2i\sqrt{3}\right)X_jX_k^3 + \left(-1+i\sqrt{3}\right)X_k = \mathbf{0},$$

8) $\left(c_j, c_k\right) \in \left\{ \begin{array}{l} \left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}, -\frac{3}{2}-\frac{i\sqrt{3}}{2}\right), \left(-\frac{1}{2}-\frac{i\sqrt{3}}{2}, -i\sqrt{3}\right), \left(1, \frac{3}{2}+\frac{i\sqrt{3}}{2}\right), \left(-\frac{1}{2}-\frac{i\sqrt{3}}{2}, \frac{3}{2}-\frac{i\sqrt{3}}{2}\right), \left(1, i\sqrt{3}\right), \\ \left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}, -\frac{3}{2}+\frac{i\sqrt{3}}{2}\right), \left(1, \frac{1}{2}+\frac{i\sqrt{3}}{2}\right), \left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}, -1\right), \left(-\frac{1}{2}-\frac{i\sqrt{3}}{2}, \frac{1}{2}-\frac{i\sqrt{3}}{2}\right) \end{array} \right\}$

ve $\left(-6-2i\sqrt{3}\right)X_j^3X_k + \left(9-9i\sqrt{3}\right)X_j^2X_k^2 + \left(18+6i\sqrt{3}\right)X_jX_k^3 + \left(-3+5i\sqrt{3}\right)X_k = \mathbf{0}$,

9) $c_1 + \left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}\right)c_2 \in \left\{-\frac{1}{2}+\frac{i\sqrt{3}}{2}, -\frac{1}{2}-\frac{i\sqrt{3}}{2}, 1, 0\right\}$ ve $\left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}\right)X_1 = X_2$,

10) $\left(c_j, c_k\right) \in \left\{ \begin{array}{l} \left(\frac{3}{2}-\frac{i\sqrt{3}}{2}, 1\right), \left(\frac{3}{2}+\frac{i\sqrt{3}}{2}, -\frac{1}{2}+\frac{i\sqrt{3}}{2}\right), \left(i\sqrt{3}, -\frac{1}{2}+\frac{i\sqrt{3}}{2}\right), \left(-\frac{3}{2}+\frac{i\sqrt{3}}{2}, -\frac{1}{2}-\frac{i\sqrt{3}}{2}\right), \left(-i\sqrt{3}, 1\right), \\ \left(-\frac{3}{2}-\frac{i\sqrt{3}}{2}, -\frac{1}{2}-\frac{i\sqrt{3}}{2}\right), \left(\frac{1}{2}-\frac{i\sqrt{3}}{2}, 1\right), \left(\frac{1}{2}+\frac{i\sqrt{3}}{2}, -\frac{1}{2}+\frac{i\sqrt{3}}{2}\right), \left(-1, -\frac{1}{2}-\frac{i\sqrt{3}}{2}\right) \end{array} \right\}$

ve $\left(-6-4i\sqrt{3}\right)X_j - 12iX_j^3X_k + \left(9-9i\sqrt{3}\right)X_j^2X_k^2 + \left(6-2i\sqrt{3}\right)X_jX_k^3 = \mathbf{0}$,

11) $c_1 + \left(-\frac{1}{2}-\frac{i\sqrt{3}}{2}\right)c_2 \in \left\{-\frac{1}{2}+\frac{i\sqrt{3}}{2}, -\frac{1}{2}-\frac{i\sqrt{3}}{2}, 1, 0\right\}$ ve $\left(-\frac{1}{2}-\frac{i\sqrt{3}}{2}\right)X_1 = X_2$,

12) $\left(c_j, c_k\right) \in \left\{ \begin{array}{l} \left(1,1\right), \left(1, -\frac{1}{2}+\frac{i\sqrt{3}}{2}\right), \left(1, -\frac{1}{2}-\frac{i\sqrt{3}}{2}\right), \left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}, 1\right), \left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}, -\frac{1}{2}+\frac{i\sqrt{3}}{2}\right), \\ \left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}, -\frac{1}{2}-\frac{i\sqrt{3}}{2}\right), \left(-\frac{1}{2}-\frac{i\sqrt{3}}{2}, 1\right), \left(-\frac{1}{2}-\frac{i\sqrt{3}}{2}, -\frac{1}{2}+\frac{i\sqrt{3}}{2}\right), \left(-\frac{1}{2}-\frac{i\sqrt{3}}{2}, -\frac{1}{2}-\frac{i\sqrt{3}}{2}\right) \end{array} \right\}$ ve

$$4X_j^3X_k + 6X_j^2X_k^2 + 4X_jX_k^3 = \mathbf{0}.$$

4.4. Değişmeli Üç Tripotent Matrisin Lineer Bileşiminin Tripotentliği

Bu kısımda, değişmeli üç tripotent matrisin lineer bileşiminin tripotentliği problemi geliştirilen Algoritma 3.1 yardımı ile çözülecektir.

$X_i \in \mathbb{C}_n$, $i = 1,2,3$, olmak üzere $X_i^3 = X_i$ ve $X_iX_j = X_jX_i$, $i \neq j$ ve $i, j = 1,2,3$ olsun. Bu durumda, $c_i \in \mathbb{C} \setminus \{0\}$, $i = 1,2,3$, olmak üzere

$$c_1X_1 + c_2X_2 + c_3X_3 = X \tag{4.4}$$

lineer bileşiminin tripotentliği problemini, diğer bir deyişle $\sigma(X_i) \subseteq \{1,-1,0\}$ olacak biçimdeki X_i, $i=1,2,3$, matrislerinin (4.4) ile verilen X lineer bileşim matrisi ne zaman $\sigma(X) \subseteq \{1,-1,0\}$ olacak biçimde bir matris olur problemini ele alalım. Teorem 2.40'dan X_i, $i=1,2,3$, tripotent matrislerinin köşegenleştirilebilir oldukları ve Teorem 2.31'den eşzamanlı köşegenleştirilebilir oldukları bilinmektedir.

(4.4) lineer bileşiminin tripotent olmasının gerekli ve yeterli koşulun

$$\begin{aligned}&\left(c_1^3-c_1\right)X_1+3c_1^2c_2X_1^2X_2+3c_1c_2^2X_1X_2^2+\left(c_2^3-c_2\right)X_2+3c_1^2c_3X_1^2X_3+\\&6X_1X_2X_3+3c_2^2c_3X_2^2X_3+3c_1c_3^2X_1X_3^2+3c_2c_3^2X_2X_3^2+\left(c_3^3-c_3\right)X_3=\mathbf{0}\end{aligned} \tag{4.5}$$

olduğu doğrudan bir hesaplamayla görülmektedir. Çözüm kümesinde parametrik çözüm bulunmayan yani, çözüm kümesinde sonlu tane eleman olan sonuçlarda, matrisler ile ilgili şartlar, çözüm kümesinin ilk çözümü, eğer bu daha önce kullanıldıysa ikinci çözümü, bu da daha önce kullanıldıysa üçüncü çözümü ve bu şekilde devam ederek, ilgili çözümün (4.5) lineer bileşiminde yerine koyulmasıyla elde edilmektedir.

Teoreme geçmeden önce birbirinin ters işaretlisi olan sonuçları bir arada ifade edebilmek için kullanılacak olan $|\;|$ notasyonunu dahil etmek istiyoruz. $|\;|$ notasyonu mutlak değer fonksiyonuna benzer bir yapıdadır. Yani $|c_i| := \pm c_i$ ve $|X_i| := \pm X_i$ şeklinde tanımlı olup, hem c_i skalerleri hem de X_i, $1 \le i \le m$, matrisleri için kullanılacaktır. Bu gösterim eğer aynı ifadenin içinde hem c_i skalerleri hem de X_i, $1 \le i \le m$, matrisleri için kullanılmışsa, bu durumda aynı indisli c_i skalerleri ve X_i matrislerinin önündeki "+" veya "-" işareti aynı olmalıdır. Örneğin ,

$$\left(|c_1|,|c_2|,|c_3|\right) \in \left\{(1,-2,4),(-1,2,-4)\right\} \text{ ve } |X_1|+|X_2|+|X_3|=\mathbf{0} \tag{4.6}$$

şeklinde ifade edilen bir sonuç Tablo 4.1. de verilen sekiz sonucu temsil etmektedir.

Tablo 4.1. (4.6) ifadesi ile temsil edilen sonuçlar

1) $(c_1,c_2,c_3)\in\{(1,-2,4),(-1,2,-4)\}$ ve $X_1+X_2+X_3=\mathbf{0}$	5) $(-c_1,-c_2,-c_3)\in\{(1,-2,4),(-1,2,-4)\}$ ve $-X_1-X_2-X_3=\mathbf{0}$
2) $(-c_1,c_2,c_3)\in\{(1,-2,4),(-1,2,-4)\}$ ve $-X_1+X_2+X_3=\mathbf{0}$	6) $(c_1,-c_2,-c_3)\in\{(1,-2,4),(-1,2,-4)\}$ ve $X_1-X_2-X_3=\mathbf{0}$
3) $(c_1,-c_2,c_3)\in\{(1,-2,4),(-1,2,-4)\}$ ve $X_1-X_2+X_3=\mathbf{0}$	7) $(-c_1,c_2,-c_3)\in\{(1,-2,4),(-1,2,-4)\}$ ve $-X_1+X_2-X_3=\mathbf{0}$
4) $(c_1,c_2,-c_3)\in\{(1,-2,4),(-1,2,-4)\}$ ve $X_1+X_2-X_3=\mathbf{0}$	8) $(-c_1,-c_2,c_3)\in\{(1,-2,4),(-1,2,-4)\}$ ve $-X_1-X_2+X_3=\mathbf{0}$

Teorem 4.3. X_1, X_2 ve $X_3 \in \mathbb{C}_n$ matrisleri üç değişmeli tripotent matris ve c_1, c_2 ve $c_3 \in \mathbb{C}\setminus\{0\}$ olsun. Bu durumda, $c_1X_1+c_2X_2+c_3X_3$ lineer bileşim matrisinin tripotent olmasının gerekli ve yeterli koşulu $i\neq j, i\neq k, j\neq k$ ve $i,j,k=1,2,3$ ve $p\neq q$ ve $p,q=1,2$ olmak üzere, aşağıdaki şartlardan birinin sağlanmasıdır:

1) $|c_1|+|c_2|+|c_3|\in\{1,-1,0\}$ ve $|X_1|=|X_2|=|X_3|$,

2) $\left(c_i+|c_j|,c_k\right)\in\left\{\pm(0,1),\pm\left(\tfrac{1}{2},\tfrac{1}{2}\right),\pm\left(\tfrac{1}{2},-\tfrac{1}{2}\right)\right\}$ ve $X_i=|X_j|\neq X_k$,

3) $\left(c_i+|c_j|,|c_k|\right)\in\left\{\pm(-1,2),\pm(0,1),\pm(1,-1)\right\}$ ve $X_i=|X_j|\neq|X_k|$,

4) $\left(|c_1|+\tfrac{1}{2}c_3,|c_2|+\tfrac{1}{2}c_3\right)\in\left\{\pm(1,0),\pm(0,1),\pm\left(\tfrac{1}{2},\tfrac{1}{2}\right),\pm\left(\tfrac{1}{2},-\tfrac{1}{2}\right),(0,0)\right\}$ ve $\tfrac{1}{2}|X_1|+\tfrac{1}{2}|X_2|=X_3$,

5) $\left(|c_p|+c_3,|c_q|+2c_3\right)\in\left\{\pm(1,0),\pm(-1,2),\pm(0,1),\pm(1,-1),(0,0)\right\}$ ve $|X_p|+2|X_q|=X_3$,

6) $\left(c_i+|c_j|,c_k\right)\in\left\{\pm(0,1),\pm(2,-1),\pm(-1,1)\right\}$ ve $X_i=|X_j|\neq X_k$,

7) $\left(|c_p|+c_3,|c_q|+c_3\right)\in\left\{\pm(1,0),\pm(-1,2),\pm(0,1),\pm(1,-1),(0,0)\right\}$ ve $|X_p|+|X_q|=X_3$,

8) $\left(c_i+\left|c_j\right|,c_k\right)\in\left\{\pm(1,1),\pm(1,-1),\pm(0,1)\right\}$ ve $X_i=\left|X_j\right|\neq X_k$,

9) $\left(\left|c_1\right|+c_3,\left|c_2\right|+c_3\right)\in\left\{\pm(1,1),\pm(1,-1),\pm(1,0),\pm(0,1),(0,0)\right\}$ ve

$\left|X_1\right|+\left|X_2\right|=X_3$,

10) $\left(c_i+\left|c_j\right|,c_k\right)\in\left\{\pm(0,1)\right\}$ ve $X_i=\left|X_j\right|\neq X_k$,

11) $\left(\left|c_1\right|,\left|c_2\right|,\left|c_3\right|\right)\in\left\{\pm(-1,1,1),\pm\left(-\tfrac{1}{2},\tfrac{1}{2},1\right),\pm\left(-\tfrac{1}{2},1,\tfrac{1}{2}\right),\pm\left(1,-\tfrac{1}{2},-\tfrac{1}{2},\right)\right\}$ ve

$X_1^2\left|X_2\right|-\left|X_1\right|X_2^2+X_1^2\left|X_3\right|-2\left|X_1\right|\left|X_2\right|\left|X_3\right|+X_2^2\left|X_3\right|-\left|X_1\right|X_3^2+\left|X_2\right|X_3^2=\mathbf{0}$,

12) $\left(\left|c_i\right|,\left|c_j\right|,\left|c_k\right|\right)\in\left\{\begin{array}{l}\pm\left(\tfrac{1}{2},-\tfrac{1}{2},1\right),\pm\left(-\tfrac{1}{2},\tfrac{1}{2},1\right),\pm\left(\tfrac{3}{4},-\tfrac{1}{4},\tfrac{1}{2}\right),\pm\left(-\tfrac{1}{4},\tfrac{3}{4},\tfrac{1}{2}\right),\\ \pm\left(\tfrac{1}{4},\tfrac{1}{4},\tfrac{1}{2}\right),\pm\left(\tfrac{3}{4},-\tfrac{1}{4},-\tfrac{1}{2}\right),\pm\left(-\tfrac{1}{4},\tfrac{3}{4},-\tfrac{1}{2}\right),\pm\left(\tfrac{1}{4},\tfrac{1}{4},-\tfrac{1}{2}\right)\end{array}\right\}$ ve

$$\begin{array}{l}-\tfrac{3}{8}\left|X_i\right|-\tfrac{3}{8}X_i^2\left|X_j\right|+\tfrac{3}{8}\left|X_i\right|X_j^2+\tfrac{3}{8}\left|X_j\right|+\tfrac{3}{4}X_i^2\left|X_k\right|-\tfrac{3}{2}\left|X_i\right|\left|X_j\right|\left|X_k\right|+\tfrac{3}{4}X_j^2\left|X_k\right|\\ +\tfrac{3}{2}\left|X_i\right|X_k^2-\tfrac{3}{2}\left|X_j\right|X_k^2=\mathbf{0}\end{array},$$

13) $\left(\left|c_i\right|,\left|c_j\right|,\left|c_k\right|\right)\in\left\{\begin{array}{l}\pm(-2,2,1),\pm(-1,1,1),\pm\left(-\tfrac{3}{2},2,\tfrac{1}{2}\right),\\ \pm\left(-\tfrac{1}{2},1,\tfrac{1}{2}\right),\pm\left(\tfrac{3}{2},-1,-\tfrac{1}{2}\right),\pm\left(-\tfrac{1}{2},1,-\tfrac{1}{2}\right)\end{array}\right\}$ ve

$$\begin{array}{l}-\left|X_i\right|+4X_i^2\left|X_j\right|-4\left|X_i\right|X_j^2+\left|X_j\right|+2X_i^2\left|X_k\right|-4\left|X_i\right|\left|X_j\right|\left|X_k\right|+2X_j^2\left|X_k\right|\\ -\left|X_i\right|X_k^2+\left|X_j\right|X_k^2=\mathbf{0}\end{array},$$

14) $\left(\left|c_i\right|,\left|c_j\right|,\left|c_k\right|\right)\in\left\{\begin{array}{l}\pm(1,-1,1),\pm(-1,1,1),\pm\left(1,-\tfrac{1}{2},\tfrac{1}{2}\right),\\ \pm\left(-1,\tfrac{3}{2},\tfrac{1}{2}\right),\pm\left(1,-\tfrac{1}{2},-\tfrac{1}{2}\right),\pm\left(-1,\tfrac{3}{2},-\tfrac{1}{2}\right)\end{array}\right\}$ ve

$-X_i^2\left|X_j\right|+\left|X_i\right|X_j^2+X_i^2\left|X_k\right|-2\left|X_i\right|\left|X_j\right|\left|X_k\right|+X_j^2\left|X_k\right|+\left|X_i\right|X_k^2-\left|X_j\right|X_k^2=\mathbf{0}$,

15) $\left(\left|c_i\right|,\left|c_j\right|,\left|c_k\right|\right)\in\left\{\pm\left(-\tfrac{1}{2},-\tfrac{1}{2},2\right),\pm\left(\tfrac{1}{2},-\tfrac{1}{2},1\right),\pm\left(-\tfrac{1}{2},\tfrac{1}{2},1\right),\pm\left(\tfrac{1}{2},\tfrac{1}{2},-1\right)\right\}$ ve

$$\begin{array}{l}\tfrac{3}{8}\left|X_i\right|-\tfrac{3}{8}X_i^2\left|X_j\right|-\tfrac{3}{8}\left|X_i\right|X_j^2+\tfrac{3}{8}\left|X_j\right|+\tfrac{3}{2}X_i^2\left|X_k\right|+3\left|X_i\right|\left|X_j\right|\left|X_k\right|+\tfrac{3}{2}X_j^2\left|X_k\right|\\ -6\left|X_i\right|X_k^2-6\left|X_j\right|X_k^2+6\left|X_k\right|=\mathbf{0}\end{array},$$

16) $\left(\left|c_i\right|,\left|c_j\right|,\left|c_k\right|\right)\in\left\{\begin{array}{l}\pm(-3,2,2),\pm(-2,1,2),\pm(-2,2,1),\\ \pm(-1,1,1),\pm(2,-1,-1)\end{array}\right\}$ ve

$$\begin{array}{l}-4\left|X_i\right|+9X_i^2\left|X_j\right|-6\left|X\right|_i X_j^2+\left|X_j\right|+9X_i^2\left|X_k\right|-12\left|X_i\right|\left|X_j\right|\left|X_k\right|+4X_j^2\left|X_k\right|\\ -6\left|X_i\right|X_k^2+4\left|X_j\right|X_k^2+\left|X_k\right|=\mathbf{0}\end{array},$$

17) $\left(|c_i|,|c_j|,|c_k|\right)\in\begin{Bmatrix}\pm(3,-4,2),\pm(1,-2,2),\pm(2,-3,2),\pm(2,-2,1),\\ \pm(1,-1,1),\pm(-2,3,-1),\pm(-1,2,-1)\end{Bmatrix}$ ve

$$4|X_i|-18X_i^2|X_j|+24|X_i|X_j^2-10|X_j|+9X_i^2|X_k|-24|X_i||X_j||X_k|+16X_j^2|X_k| \\ +6|X_i|X_k^2-8|X_j|X_k^2+|X_k|=\mathbf{0},$$

18) $\left(|c_i|,|c_j|,|c_k|\right)\in\begin{Bmatrix}\pm(1,-2,2),\pm(1,-1,1),\\ \pm(-1,1,1),\pm(-1,2,-1)\end{Bmatrix}$ ve

$$-X_i^2|X_j|+2|X_i|X_j^2-|X_j|+X_i^2|X_k|-4|X_i||X_j||X_k|+4X_j^2|X_k|+2|X_i|X_k^2 \\ -4|X_j|X_k^2+|X_k|=\mathbf{0},$$

19) $\left(c_i+|c_j|,c_k\right)\in\{\pm(0,1),\pm(1,-1)\}$ ve $X_i=|X_j|\neq X_k$,

20) $\left(|c_i|,|c_j|,|c_k|\right)\in\begin{Bmatrix}\pm(\frac{1}{3},-\frac{2}{3},\frac{4}{3}),\pm(\frac{2}{3},-\frac{1}{3},\frac{2}{3}),\pm(\frac{1}{3},\frac{4}{3},-\frac{2}{3}),\pm(-\frac{1}{3},\frac{2}{3},\frac{2}{3}),\\ \pm(\frac{2}{3},\frac{2}{3},-\frac{1}{3}),\pm(\frac{1}{3},\frac{1}{3},\frac{1}{3}),\pm(\frac{2}{3},-\frac{1}{3},-\frac{1}{3}),\pm(\frac{1}{3},-\frac{2}{3},\frac{1}{3}),\\ \pm(\frac{1}{3},\frac{1}{3},-\frac{2}{3})\end{Bmatrix}$ ve

$$-\tfrac{8}{27}|X_i|-\tfrac{2}{9}X_i^2|X_j|+\tfrac{4}{9}|X_i|X_j^2+\tfrac{10}{27}|X_j|+\tfrac{4}{9}X_i^2|X_k|-\tfrac{16}{9}|X_i||X_j||X_k|+\tfrac{16}{9}X_j^2|X_k| \\ +\tfrac{16}{9}|X_i|X_k^2-\tfrac{32}{9}|X_j|X_k^2+\tfrac{28}{27}|X_k|=\mathbf{0},$$

21) $\left(|c_i|,|c_j|,|c_k|\right)\in\begin{Bmatrix}\pm(-1,-2,4),\pm(1,2,-2),\pm(1,1,-1),\\ \pm(-1,-1,3),\pm(-1,-2,3),\pm(1,1,-2)\end{Bmatrix}$ ve

$$-X_i^2|X_j|-2|X_i|X_j^2-|X_j|+2X_i^2|X_k|+8|X_i||X_j||X_k|+8X_j^2|X_k|-8|X_i|X_k^2 \\ -16|X_j|X_k^2+10|X_k|=\mathbf{0},$$

22) $\left(|c_i|,|c_j|,|c_k|\right)\in\begin{Bmatrix}\pm(\frac{1}{2},-\frac{1}{2},1),\pm(\frac{3}{2},\frac{1}{2},-1),\pm(-\frac{1}{2},\frac{1}{2},1),\\ \pm(\frac{1}{2},\frac{3}{2},-1),\pm(1,1,-1),\pm(-\frac{1}{2},-\frac{1}{2},1)\end{Bmatrix}$ ve

$$-\tfrac{3}{8}|X_i|-\tfrac{3}{8}X_i^2|X_j|+\tfrac{3}{8}|X_i|X_j^2+\tfrac{3}{8}|X_j|+\tfrac{3}{4}X_i^2|X_k|-\tfrac{3}{2}|X_i||X_j||X_k|+\tfrac{3}{4}X_j^2|X_k| \\ +\tfrac{3}{2}|X_i|X_k^2-\tfrac{3}{2}|X_j|X_k^2=\mathbf{0},$$

23) $\left(|c_i|,|c_j|,|c_k|\right)\in\begin{Bmatrix}\pm(1,1,-1),\pm(1,-1,1),\pm(-1,1,1),\\ \pm(-1,-1,3),\pm(1,1,-2)\end{Bmatrix}$ ve

$$X_i^2|X_j|+|X_i|X_j^2-X_i^2|X_k|-2|X_i||X_j||X_k|-X_j^2|X_k|+|X_i|X_k^2+|X_j|X_k^2=\mathbf{0},$$

24) $\left(|c_i|,|c_j|,|c_k|\right)\in\left\{\begin{array}{l}\pm\left(\frac{1}{2},\frac{1}{2},\frac{1}{2}\right),\pm\left(\frac{1}{2},\frac{1}{2},-\frac{3}{2}\right),\pm\left(\frac{1}{2},\frac{1}{2},-\frac{1}{2}\right),\\ \pm\left(\frac{1}{2},-\frac{1}{2},\frac{1}{2}\right),\pm\left(\frac{1}{2},-\frac{1}{2},-\frac{3}{2}\right),\pm\left(\frac{1}{2},-\frac{1}{2},-\frac{1}{2}\right)\end{array}\right\}$ ve

$$\begin{array}{l}-\frac{3}{8}|X_i|+\frac{3}{8}X_i^2|X_j|+\frac{3}{8}|X_i|X_j^2-\frac{3}{8}|X_j|+\frac{3}{8}X_i^2|X_k|+\frac{3}{4}|X_i||X_j||X_k|+\frac{3}{8}X_j^2|X_k|\\ +\frac{3}{8}|X_i|X_k^2+\frac{3}{8}|X_j|X_k^2-\frac{3}{8}|X_k|=\mathbf{0}\end{array},$$

25) $\left(c_i,c_j,c_k\right)\in\left\{\pm\left(\frac{1}{2},\frac{1}{2},1\right),\pm\left(\frac{1}{2},\frac{1}{2},-1\right),\pm\left(\frac{1}{2},-\frac{1}{2},1\right),\pm\left(-\frac{1}{2},\frac{1}{2},1\right)\right\}$ ve

$$\begin{array}{l}-\frac{3}{8}X_i+\frac{3}{8}X_i^2X_j+\frac{3}{8}X_iX_j^2-\frac{3}{8}X_j+\frac{3}{4}X_i^2X_k+\frac{3}{2}X_iX_jX_k+\frac{3}{4}X_j^2X_k+\frac{3}{2}X_iX_k^2\\ +\frac{3}{2}X_jX_k^2=\mathbf{0}\end{array},$$

26) $\left(|c_i|,|c_j|,|c_k|\right)\in\left\{\pm(-1,2,2),\pm(-1,2,1),\pm(-1,1,2),\pm(1,-1,-1)\right\}$ ve

$$\begin{array}{l}X_i^2|X_j|-2|X_i|X_j^2+|X_j|+X_i^2|X_k|-4|X_i||X_j||X_k|+4X_j^2|X_k|-2|X_i|X_k^2\\ +4|X_j|X_k^2+|X_k|=\mathbf{0}\end{array}$$

27) $\left(|c_1|,|c_2|,|c_3|\right)\in\left\{\begin{array}{l}\pm\left(\frac{1}{2},\frac{1}{2},\frac{1}{2}\right),\pm\left(\frac{3}{2},-\frac{1}{2},-\frac{1}{2}\right),\pm\left(-\frac{1}{2},\frac{3}{2},-\frac{1}{2}\right),\pm\left(\frac{1}{2},\frac{1}{2},-\frac{3}{2}\right),\\ \pm\left(\frac{1}{2},\frac{1}{2},-\frac{1}{2}\right),\pm\left(\frac{1}{2},-\frac{1}{2},\frac{1}{2}\right),\pm\left(-\frac{1}{2},\frac{1}{2},\frac{1}{2}\right)\end{array}\right\}$ ve

$$\begin{array}{l}\frac{15}{8}|X_1|-\frac{27}{8}X_1^2|X_2|+\frac{9}{8}|X_1|X_2^2+\frac{3}{8}|X_2|-\frac{27}{8}X_1^2|X_3|+\frac{9}{4}|X_1||X_2||X_3|-\frac{3}{8}X_2^2|X_3|\\ +\frac{9}{8}|X_1|X_3^2-\frac{3}{8}|X_2|X_3^2+\frac{3}{8}|X_3|=\mathbf{0}\end{array},$$

28) $\left(|c_1|+c_3,|c_2|+c_3\right)\in\left\{\pm(1,0),\pm(0,1),\pm(1,-1),(0,0)\right\}$ ve $|X_1|+|X_2|=X_3$,

29) $\left(|c_i|,|c_j|,|c_k|\right)\in\left\{\begin{array}{l}\pm(2,-1,-1),\pm(2,-1,-3),\pm(2,-1,-2),\\ \pm(-1,1,2),\pm(-1,1,1)\end{array}\right\}$ ve

$$\begin{array}{l}2|X_i|-4X_i^2|X_j|+2|X_i|X_j^2-4X_i^2|X_k|+4|X_i||X_j||X_k|-X_j^2|X_k|+2|X_i|X_k^2\\ -|X_j|X_k^2=\mathbf{0}\end{array},$$

30) $\left(|c_i|,|c_j|,|c_k|\right)\in\left\{\pm(-1,2,1),\pm(1,-2,1),\pm(1,-1,1),\pm(-1,1,1)\right\}$ ve

$$\begin{array}{l}2X_i^2|X_j|-4|X_i|X_j^2+2|X_j|+X_i^2|X_k|-4|X_i||X_j||X_k|+4X_j^2|X_k|-|X_i|X_k^2\\ +|X_j|X_k^2=\mathbf{0}\end{array},$$

31) $\left(c_1,c_2,c_3\right)\in\left\{\pm(1,1,1),\pm(1,1,-1),\pm(1,-1,1),\pm(-1,1,1)\right\}$ ve

$$X_1^2X_2+X_1X_2^2+X_1^2X_3+2X_1X_2X_3+X_2^2X_3+X_1X_3^2+X_2X_3^2=\mathbf{0}.$$

4.5. Değişmeli Dört İnvolutif Matrisin Lineer Bileşiminin Tripotentliği

Bu kısımda değişmeli dört involutif matrisin lineer bileşim matrisinin tripotentliği problemi geliştirilen Algoritma 3.1 yardımı ile çözülecektir

$X_i \in \mathbb{C}_n$, $i=1,2,3,4$, olmak üzere $X_i^2 = I_n$ ve $X_i X_j = X_j X_i$, $i \neq j$ ve $i,j=1,2,3,4$, olsun. Bu durumda $c_i \in \mathbb{C} \setminus \{0\}$, $i=1,2,3,4$, olmak üzere

$$c_1X_1 + c_2X_2 + c_3X_3 + c_4X_4 = X \tag{4.7}$$

lineer bileşim matrisinin tripotentliği problemini, diğer bir deyişle $\sigma(X_i) \subseteq \{1,-1\}$ olacak biçimdeki X_i, $i=1,2,3,4$, matrislerinin (4.7) ile verilen X lineer bileşim matrisi ne zaman $\sigma(X) \subseteq \{1,-1,0\}$ olacak biçimde bir matris olur problemini ele alalım. Teorem 2.42'den X_i, $i=1,2,3,4$, involutif matrislerinin köşegenleştirilebilir oldukları ve Teorem 2.31'den eşzamanlı köşegenleştirilebilir oldukları bilinmektedir.

Doğrudan bir hesaplamayla görülmektedir ki (4.7) lineer bileşiminin tripotent olmasının gerekli ve yeterli koşulu

$$\begin{aligned}
&\left(c_1^3 + 3c_1c_2^2 + 3c_1c_3^2 + 3c_1c_4^2 - c_1\right)X_1 + \left(c_2^3 + 3c_1^2c_2 + 3c_2c_3^2 + 3c_2c_4^2 - c_2\right)X_2 + \\
&\left(c_3^3 + 3c_1^2c_3 + 3c_2^2c_3 + 3c_3c_4^2 - c_3\right)X_3 + \left(c_4^3 + 3c_1^2c_4 + 3c_2^2c_4 + 3c_3^2c_4 - c_4\right)X_4 + \\
&6c_1c_2c_3X_1X_2X_3 + 6c_1c_2c_4X_1X_2X_4 + 6c_1c_3c_4X_1X_3X_4 + 6c_2c_3c_4X_2X_3X_4 = \mathbf{0}
\end{aligned} \tag{4.8}$$

olmasıdır. Çözüm kümesinde parametrik çözüm bulunmayan, yani çözüm kümesinde sonlu tane eleman olan sonuçlarda, matrisler ile ilgili şartlar, çözüm kümesinin ilk çözümü, eğer bu daha önce kullanıldıysa ikinci çözümü, bu da daha önce kullanıldıysa üçüncü çözümü ve bu şekilde devam ederek, ilgili çözümün (4.8) lineer bileşiminde yerine koyulmasıyla elde edilmektedir. Teorem 4.3'de kullanılan $|\ |$ notasyonu Teorem 4.4'de de kullanılacaktır.

Teorem 4.4. X_1, X_2, X_3 ve $X_4 \in \mathbb{C}_n$ matrisleri dört değişmeli involutif matris ve c_1, c_2, c_3 ve $c_4 \in \mathbb{C} \setminus \{0\}$ olsun. Bu durumda, $c_1X_1 + c_2X_2 + c_3X_3 + c_4X_4$ lineer bileşim matrisinin tripotent olmasının gerekli ve yeterli koşulu $i \neq j, i \neq k, j \neq k, l \neq i, l \neq j,$ $l \neq k$ ve $i, j, k, l = 1, 2, 3, 4$ olmak üzere, aşağıdaki şartlardan birinin sağlanmasıdır:

1) $|c_1| + |c_2| + |c_3| + |c_4| \in \{1, -1, 0\}$ ve $|X_1| = |X_2| = |X_3| = |X_4|$,

2) $j < k$ ve $j < l$ olmak üzere $\left(c_i, c_j + |c_k| + |c_l|\right) \in \left\{\pm(1,0), \pm\left(\frac{1}{2}, \frac{1}{2}\right), \pm\left(\frac{1}{2}, -\frac{1}{2}\right)\right\}$ ve $X_i \neq X_j = |X_k| = |X_l|$,

3) $i < j$ ve $k < l$ olmak üzere $\left(c_i + |c_j|, c_k + |c_l|\right) \in \left\{\pm(1,0), \pm(0,1), \pm\left(\frac{1}{2}, \frac{1}{2}\right), \pm\left(\frac{1}{2}, -\frac{1}{2}\right), (0,0)\right\}$ ve $X_i = |X_j| \neq X_k = |X_l|$,

4) $i < j$ olmak üzere $\left(|c_i| + |c_j|, |c_k|, |c_l|\right) \in \left\{\begin{matrix} \pm(-1,1,1), \pm\left(-\frac{1}{2}, \frac{1}{2}, 1\right), \pm\left(-\frac{1}{2}, 1, \frac{1}{2}\right), \\ \pm\left(0, \frac{1}{2}, \frac{1}{2}\right), \pm\left(1, -\frac{1}{2}, -\frac{1}{2}\right), \pm\left(0, \frac{1}{2}, -\frac{1}{2}\right) \end{matrix}\right\}$ ve $|X_i| = |X_j| \neq |X_k| \neq |X_l|$,

5) $\left(|c_1| + c_4, |c_2| + c_4, |c_3| + c_4\right) \in \left\{\begin{matrix} \pm(1,0,0), \pm(0,1,0), \pm\left(\frac{1}{2}, \frac{1}{2}, 0\right), \pm(0,0,1), \\ \pm(-1,1,1), \pm\left(-\frac{1}{2}, \frac{1}{2}, 1\right), \pm\left(\frac{1}{2}, 0, \frac{1}{2}\right), \pm\left(-\frac{1}{2}, 1, \frac{1}{2}\right), \\ \pm\left(0, \frac{1}{2}, \frac{1}{2}\right), \pm\left(1, -\frac{1}{2}, -\frac{1}{2}\right), \pm\left(0, \frac{1}{2}, -\frac{1}{2}\right), \pm\left(\frac{1}{2}, 0, -\frac{1}{2}\right), \\ \pm\left(\frac{1}{2}, -\frac{1}{2}, 0\right), (0,0,0) \end{matrix}\right\}$ ve $|X_1| + |X_2| + |X_3| = X_4$,

6) $i < j$ olmak üzere $\left(c_i + |c_j|, c_k, c_l\right) \in \left\{\pm\left(0, \frac{1}{2}, \frac{1}{2}\right), \pm\left(0, \frac{1}{2}, -\frac{1}{2}\right)\right\}$ ve $X_i = |X_j| \neq |X_k| \neq |X_l|$,

7) $\left(|c_i|, |c_j|, |c_k|, |c_l|\right) \in \left\{\begin{matrix} \pm(-2,1,1,1), \pm\left(-\frac{3}{2}, \frac{1}{2}, 1, 1\right), \pm\left(-\frac{3}{2}, 1, \frac{1}{2}, 1\right), \pm\left(-1, \frac{1}{2}, \frac{1}{2}, 1\right), \\ \pm\left(-\frac{3}{2}, 1, 1, \frac{1}{2}\right), \pm\left(-1, \frac{1}{2}, 1, \frac{1}{2}\right), \pm\left(-1, 1, \frac{1}{2}, \frac{1}{2}\right), \pm\left(-\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}\right), \\ \pm\left(-\frac{3}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}\right), \pm\left(\frac{1}{2}, \frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}\right), \pm\left(\frac{1}{2}, -\frac{1}{2}, \frac{1}{2}, -\frac{1}{2}\right), \pm\left(-\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, -\frac{1}{2}\right) \end{matrix}\right\}$ ve

$$\begin{gathered} -4|X_i| + 3|X_j| + 3|X_k| + 3|X_l| - 2|X_i||X_j||X_k| - 2|X_i||X_j||X_l| - 2|X_i||X_k||X_l| \\ + |X_j||X_k||X_l| = \mathbf{0} \end{gathered},$$

8) $\left(|c_i|,|c_j|,|c_k|,|c_l|\right)\in\left\{\begin{array}{l}\pm\left(-\frac{1}{2},-\frac{1}{2},1,1\right),\pm\left(\frac{1}{2},-1,\frac{1}{2},1\right),\pm\left(-1,\frac{1}{2},1,\frac{1}{2}\right),\pm\left(\frac{1}{2},-\frac{1}{2},\frac{1}{2},\frac{1}{2}\right),\\ \pm\left(-\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{1}{2}\right),\pm\left(\frac{1}{2},\frac{1}{2},-\frac{1}{2},-\frac{1}{2}\right),\pm\left(-1,1,\frac{1}{2},-\frac{1}{2}\right),\pm\left(-\frac{1}{2},\frac{1}{2},\frac{1}{2},-\frac{1}{2}\right)\end{array}\right\}$ ve

$$-3X_1-3X_2+\tfrac{9}{2}X_3+\tfrac{9}{2}X_4+\tfrac{3}{2}X_1X_2X_3+\tfrac{3}{2}X_1X_2X_4-3X_1X_3X_4-3X_2X_3X_4=\mathbf{0},$$

9) $\left(c_1,c_2,c_3,|c_4|\right)\in\left\{\begin{array}{l}\pm\left(\frac{1}{2},\frac{1}{2},\frac{1}{2},-\frac{1}{2}\right),\pm\left(\frac{3}{4},\frac{1}{4},\frac{1}{4},-\frac{1}{4}\right),\pm\left(\frac{1}{2},\frac{1}{2},-\frac{1}{2},\frac{1}{2}\right),\pm\left(\frac{1}{4},\frac{3}{4},-\frac{1}{4},\frac{1}{4}\right),\pm\left(\frac{3}{4},\frac{1}{4},-\frac{1}{4},\frac{1}{4}\right),\\ \pm\left(\frac{1}{4},\frac{3}{4},\frac{1}{4},-\frac{1}{4}\right),\pm\left(\frac{1}{2},-\frac{1}{2},\frac{1}{2},\frac{1}{2}\right),\pm\left(\frac{1}{4},-\frac{1}{4},\frac{3}{4},\frac{1}{4}\right),\pm\left(-\frac{1}{2},\frac{1}{2},\frac{1}{2},\frac{1}{2}\right),\pm\left(-\frac{1}{4},\frac{1}{4},\frac{1}{4},\frac{3}{4}\right),\\ \pm\left(\frac{1}{4},-\frac{1}{4},\frac{1}{4},\frac{3}{4}\right),\pm\left(-\frac{1}{4},\frac{1}{4},\frac{3}{4},\frac{1}{4}\right),\pm\left(\frac{3}{4},-\frac{1}{4},\frac{1}{4},\frac{1}{4}\right),\pm\left(\frac{1}{4},\frac{1}{4},\frac{3}{4},-\frac{1}{4}\right),\pm\left(\frac{1}{4},\frac{1}{4},-\frac{1}{4},\frac{3}{4}\right),\\ \pm\left(-\frac{1}{4},\frac{3}{4},\frac{1}{4},\frac{1}{4}\right),\pm\left(\frac{1}{4},\frac{1}{4},\frac{1}{4},\frac{1}{4}\right),\pm\left(-\frac{3}{4},\frac{1}{4},\frac{1}{4},\frac{1}{4}\right),\pm\left(\frac{1}{4},\frac{1}{4},\frac{1}{4},-\frac{3}{4}\right),\pm\left(\frac{1}{4},\frac{1}{4},-\frac{3}{4},\frac{1}{4}\right),\\ \pm\left(\frac{1}{4},-\frac{3}{4},\frac{1}{4},\frac{1}{4}\right),\pm\left(\frac{1}{4},\frac{1}{4},-\frac{1}{4},-\frac{1}{4}\right),\pm\left(\frac{1}{4},-\frac{1}{4},\frac{1}{4},-\frac{1}{4}\right),\pm\left(\frac{1}{4},-\frac{1}{4},-\frac{1}{4},\frac{1}{4}\right)\end{array}\right\}$ ve

$$X_1+X_2+X_3-|X_4|+X_1X_2X_3-X_1X_2|X_4|-X_1X_3|X_4|-X_2X_3|X_4|=\mathbf{0}.$$

BÖLÜM 5. TARTIŞMA VE ÖNERİLER

Bu çalışmanın üçüncü bölümünde ortaya konulan kombinatorik yöntem temel alınarak sonlu sayıda değişmeli köşegenleştirilebilir matrisin lineer bileşimini karakterize eden bir algoritma geliştirildi. Bu kombinatorik yöntem ve Teorem 4.3'ün bir özel hali olan karşılıklı değişmeli iki tripotent ve bir involutif matrisin lineer bileşiminin tripotentliği probleminin çözümü [28] çalışmasında sunulmuştur. Girdi olarak lineer bileşimdeki matrislerin spektrumlarını alan algoritma, katsayıları bu spektrumlardan seçilen lineer sistemleri çözüp benzer sonuçları gruplamak suretiyle çıktı olarak lineer bileşimin karakterizasyonunu vermektedir. Ayrıca algoritmanın Mathematica 9.0 paket programındaki uygulama kodları Ek A kısmında verilmiştir. Böylece literatürde birçok yazar tarafından ele alınmış olan özel tipli matrislerin lineer bileşiminin karakterizasyonu problemlerinin değişmeli matrisler için olan kısmı bilgisayar programlarıyla çözülebilir hale gelmiştir. Dolayısıyla artık bu tür özel tipli matrislerin lineer bileşimlerinin karakterizasyonu problemleri istenildiği sayıda matrisin lineer bileşimi için çözülebilmektedir. Böylece bu tür karakterizasyon problemlerinin uygulamalı bilimlerdeki kullanım alanlarında da önemli kolaylıklar elde edilmiştir. Örneğin, istatistik teorisinde A $n\times n$ boyutlu reel ve simetrik bir matris ve $\mathbf{x}$ vektörü de çok değişkenli $N_n(\mathbf{0}, I_n)$ normal dağılımına sahip $n\times 1$ boyutlu rastgele bir reel vektör ise, bu durumda $\mathbf{x}^T A\mathbf{x}$ kuadratik formunun ki-kare dağılımına sahip olmasının gerekli ve yeterli koşulu A matrisinin idempotent, iki bağımsız ki-kare dağılımının farkı olarak yazılabilmesinin gerekli ve yeterli koşulu ise A matrisinin tripotent olmasıdır [1]. Dolayısıyla A_1 ve A_2 $n\times n$ boyutlu reel ve simetrik matrisler ve $\mathbf{x}$ vektörü de çok değişkenli $N_n(\mathbf{0}, I_n)$ normal dağılımına sahip $n\times 1$ boyutlu rastgele bir reel vektör olmak üzere, [5] çalışmasında ele alınan iki değişmeli idempotent matrisin lineer bileşiminin idempotentliği problemi istatistik teorisinde ki-kare dağılımına sahip $\mathbf{x}^T A_1\mathbf{x}$ ve $\mathbf{x}^T A_2\mathbf{x}$ kuadratik formlarının $c_1\mathbf{x}^T A_1\mathbf{x} + c_2\mathbf{x}^T A_2\mathbf{x}$ şeklindeki lineer bileşimi ne zaman ki-kare dağılımına sahip bir kuadratik form olur problemine denktir. Benzer biçimde [15] çalışmasında ele alınan iki değişmeli tripotent matrisin lineer bileşiminin tripotentliği problemi istatistik teorisinde iki bağımsız ki-kare dağılımının farkı olarak yazılabilen $\mathbf{x}^T A_1 \mathbf{x}$ ve $\mathbf{x}^T A_2 \mathbf{x}$ kuadratik formlarının $c_1\mathbf{x}^T A_1 \mathbf{x} + c_2\mathbf{x}^T A_2 \mathbf{x}$ şeklindeki lineer bileşimi ne zaman iki bağımsız ki-kare dağılımının farkı olarak yazılabilir problemine denktir. Böylece, algoritma yardımıyla bu problemler de sonlu sayıda kuadratik formun lineer bileşimi için çözülebilmektedir.

Dördüncü bölümde değişmeli iki kübik matrisin lineer bileşiminin kübikliği, değişmeli iki kuadripotent matrisin lineer bileşiminin kuadripotentliği, değişmeli üç tripotent matrisin lineer bileşiminin tripotentliği ve değişmeli dört involutif matrisin lineer bileşiminin tripotentliği problemleri geliştirilen algoritma yardımıyla çözülmüştür. Problemler algoritma yardımıyla çözüldüğünden ispatları program çıktısı olarak Ek B kısmında verilmiştir. Bu dört problem, sonuçlarının ifadeleri çok uzun olmadığı için ele alınmıştır. Benzer başka problemlerinde çözülebileceği açıktır. Bazı ele alınabilecek olan açık problemler ve bu problemlerin çözümü için çözülmesi gereken lineer sistem sayısı Tablo 5.1.’de listelenmiştir. Ayrıca, geliştirilen algoritmanın doğru sonuçlar verdiğini göstermek adına, literatürde ele alınmış olan iki idempotent matrisin lineer bileşiminin idempotentliği probleminin değişmeli matrisler için olan kısmı [5], değişmeli iki tripotent matrisin lineer bileşimin tripotentliği [15], ikisi değişmeli üç idempotent matrisin lineer bileşiminin idempotentliği probleminin karşılıklı değişmeli matrisler için olan kısmı [25] ve karşılıklı değişmeli iki involutif bir tripotent matrisin lineer bileşiminin tripotentliği [27] problemleri Algoritma 3.1 yardımıyla yeniden ele alınmış ve aynı sonuçlar bulunmuştur. Elde edilen sonuçların çıktıları [5], [15], [25] ve [27] referanslarında elde edilen sonuçlar ile karşılaştırılarak Ek C kısmında verilmiştir.

Tablo 5.1.. Bazı açık problemler

Problem	Problemin çözümü için çözülmesi gereken lineer sistem sayısı
1) Değişmeli üç kuadratik matrisin lineer bileşimin kuadratikliği	$\binom{8}{1}+\binom{8}{2}+\binom{8}{3}=92$
2) Değişmeli üç kübik matrisin lineer bileşimin kübikliği	$\binom{27}{1}+\binom{27}{2}+\binom{27}{3}=3033$
3) Değişmeli üç kuadripotent matrisin lineer bileşimin kuadripotentliği	$\binom{63}{1}+\binom{63}{2}+\binom{63}{3}=41727$
4) Değişmeli dört kuadratik matrisin lineer bileşimin kuadratikliği	$\binom{16}{1}+\binom{16}{2}+\binom{16}{3}+\binom{16}{4}=2516$
5) Değişmeli dört kübik matrisin lineer bileşimin kübikliği	$\binom{81}{1}+\binom{81}{2}+\binom{81}{3}+\binom{81}{4}=1752381$
6) Değişmeli dört tripotent matrisin lineer bileşimin tripotentliği	$\binom{40}{1}+\binom{40}{2}+\binom{40}{3}+\binom{40}{4}=102090$
7) Değişmeli dört kuadripotent matrisin lineer bileşimin kuadripotentliği	$\binom{255}{1}+\binom{255}{2}+\binom{255}{3}+\binom{255}{4}=174825280$

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EKLER

EK A: Algoritma 3.1'in Mathematica 9.0 Programındaki Uygulama Kodları

```
n=3; (*Please enter the number of matrices in the
combinations*)
X1={}; (*Please enter the eigenvalues of the first matrix
in the combinations*)
X2={}; (*Please enter the eigenvalues of the second
matrix in the combinations*)
X3={}; (*Please enter the eigenvalues of the third matrix
in the combinations*)
K=Tuples[{X1,X2,X3}];(*Please modify*)
Print["K= ",MatrixForm[K]];

B={};(*Please enter the eigenvalues of the linear
combination matrix*)
size1B=Length[B];
For[i=1,i<=n,i++,
  Bi=Transpose[Tuples[B,i]];
  Print[i,". Matrix B= ",MatrixForm[Bi]];
  ];

Ctrl = 0;
For[i = 1, i <= size1B, i++,
  If[Count[B, -B[[i]]] == 0,
    Ctrl = 1;
    ];
```

```
  ];

For[i = 1, i <= Length[K], i++,
  If[Norm[K[[i]]] == 0,
    K = Drop[K, {i}, {}];
    ];
  ];

For[i = 1, i <= Length[K] - 1, i++,
 For[j = i + 1, j <= Length[K], j++,
  If[Ctrl == 0 && K[[i]] == -K[[j]],
    K = Drop[K, {j}, {}];
    ];(*if*)
  ];(*For2*)
 ];(*For1*)

Print["K= ", MatrixForm[K]];

KAll = Subsets[K, {1, n}];
ZMC = {};
For[i = 1, i <= Length[KAll], i++,
Ai = KAll[[i]];
 For[j = 1, j <= n, j++,
  If[Norm[ Ai [[All, j]]] == 0 ,
    ZMC = Append[ZMC, i];
    Break[];
    ];
  ];
temp = Length[Ai];
ABi = Join[Ai, Btemp, 2];
```

```
RRABᵢ = RootReduce[RowReduce[ABᵢ]];
RRAᵢ = RRABᵢ[[All, 1 ;; n]];
RRBᵢ = RRABᵢ[[All, n + 1 ;; n + size1B^temp]];

NS = {};

If[MemberQ[ZMC, i] == False,
 For[j = temp, j >= 1, j--,
   temp2 = Length[Transpose[RRBᵢ]];
   If[Norm[RRAᵢ[[j]]] == 0,
    While[True,
      ctrl = 0;
      For[k = 1, k <= temp2, k++,
       If[RRBᵢ[[j, k]] != 0,
         RRBᵢ = Drop[RRBᵢ, {}, {k}];
         temp2 = temp2 - 1;
         ctrl = 1;
         Break[];
         ];
       ];
      If[ctrl == 0,
       Break[];
       ];
      ];
    ];
   ];
If[Length[RRBᵢ] == 0,
  NS = Append[NS, i];
  ];
```

```
If[MemberQ[NS, i] == False,
      For[j = 1, j <= temp, j++,
       temp2 = Length[Transpose[RRBi]];
       If[Count[RRAi[[j]], 0] == n - 1,
        While[True,
          ctrl = 0;
          For[k = 1, k <= temp2, k++,
           If[RRBi[[j, k]] == 0,
             RRBi = Drop[RRBi, {}, {k}];
             temp2 = temp2 - 1;
             ctrl = 1;
             Break[];
             ];
           ];
          If[ctrl == 0,
           Break[];
           ];
          ];
        ];
       ];
      Print[i, MatrixForm[Ai],
       MatrixForm[RRAi], MatrixForm[RRBi]];
      ];
    ];
  ];
Print[ZMC];
Print[NS];

For[i = 1, i <= Length[KAll], i++,
  If[MemberQ[Union[ZMC, NS], i] == False,
```

```
    ZRRAi = Join[RRAi, -RRAi, 2];
    ZRRBi = Join[RRBi, -RRBi, 2];
    For[k = Length[RRAi], k >= 1, k--,
     If[Norm[ZRRAi[[k]]] == 0,
       ZRRAi = Drop[ZRRAi, {k}, {}];
       ZRRBi = Drop[ZRRBi, {k}, {}];
       ,
       Break[];
       ];
     ];
    ];
  ];
list = Union[ZMC, NS];
gn = 0;
For[i = 1, i <= Length[KAll] - 1, i++,
 If[MemberQ[list, i] == False,
  gn = gn + 1;
  Print[gn, " st group"];
  list = Append[list, i];
Print[i,MatrixForm[Ai],MatrixForm[RRAi],MatrixForm[RRBi]];

  For[j = i + 1, j <= Length[KAll], j++,
   If[MemberQ[list, j] == False &&
     Length[ZRRAi] == Length[ZRRAj] &&
     Length[Transpose[ZRRBi]]== Length[Transpose[ZRRBj]],
    ctrl = 0;
    For[p = 1, p <= Length[ZRRAi], p++,
     For[q = 1, q <= Length[ZRRAj], q++,
       If[Sort[ZRRAi[[p]]] == Sort[ZRRAj[[q]]] &&
          Sort[ZRRBi[[p]]] == Sort[ZRRBj[[q]]],
```

```
         ctrl = ctrl + 1;
         Break[];
         ];
       ];
     ];
If[ctrl == Length[ZRRAi],

ctrl2 = 0;
For[p = 1, p <= Length[Transpose[RRBi]], p++,
 For[q = 1, q <= Length[Transpose[RRBj]], q++,
  If[Sort[Transpose[Join[Transpose[RRBi],Transpose[-
RRBi],2]][[All,p]]]==Sort[Transpose[Join[Transpose[[RRBj]
,
          Transpose[-RRBj], 2]][[All, q]]],
     ctrl2 = ctrl2 + 1;
     Break[];
     ];
   ];
 ];

If[ctrl2 == Length[Transpose[Subscript[RRB, i]]],
            list = Append[list, j];

            Print[j,
MatrixForm[Aj],MatrixForm[RRAj],MatrixForm[RRBj]];
            ];
          ];

        ];
      ];
```

```
    ];
  ];
```

EK B: Çalışmadaki Sonuçların Algoritma 3.1 Kullanılarak Elde Edilen Çıktıları

Teorem 4.1'in çıktıları

Grup 1

$$1(\alpha_1 \quad \alpha_2)\left(1 \quad \frac{\alpha_2}{\alpha_1}\right)\left(\frac{\alpha}{\alpha_1} \quad \frac{\beta}{\alpha_1} \quad \frac{\gamma}{\alpha_1}\right)$$

Grup 2

$$2(\alpha_1 \quad \beta_2)\left(1 \quad \frac{\beta_2}{\alpha_1}\right)\left(\frac{\alpha}{\alpha_1} \quad \frac{\beta}{\alpha_1} \quad \frac{\gamma}{\alpha_1}\right)$$

Grup 3

$$3(\alpha_1 \quad \gamma_2)\left(1 \quad \frac{\gamma_2}{\alpha_1}\right)\left(\frac{\alpha}{\alpha_1} \quad \frac{\beta}{\alpha_1} \quad \frac{\gamma}{\alpha_1}\right)$$

Grup 4

$$4(\beta_1 \quad \alpha_2)\left(1 \quad \frac{\alpha_2}{\beta_1}\right)\left(\frac{\alpha}{\beta_1} \quad \frac{\beta}{\beta_1} \quad \frac{\gamma}{\beta_1}\right)$$

Grup 5

$$5(\beta_1 \quad \beta_2)\left(1 \quad \frac{\beta_2}{\beta_1}\right)\left(\frac{\alpha}{\beta_1} \quad \frac{\beta}{\beta_1} \quad \frac{\gamma}{\beta_1}\right)$$

Grup 6

$$6(\beta_1 \quad \gamma_2)\left(1 \quad \frac{\gamma_2}{\beta_1}\right)\left(\frac{\alpha}{\beta_1} \quad \frac{\beta}{\beta_1} \quad \frac{\gamma}{\beta_1}\right)$$

Grup 7

$$7(\gamma_1 \quad \alpha_2)\left(1 \quad \frac{\alpha_2}{\gamma_1}\right)\left(\frac{\alpha}{\gamma_1} \quad \frac{\beta}{\gamma_1} \quad \frac{\gamma}{\gamma_1}\right)$$

Grup 8

$$8(\gamma_1 \quad \beta_2)\left(1 \quad \frac{\beta_2}{\gamma_1}\right)\left(\frac{\alpha}{\gamma_1} \quad \frac{\beta}{\gamma_1} \quad \frac{\gamma}{\gamma_1}\right)$$

Grup 9

$$9\begin{pmatrix}\gamma_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & \frac{\gamma_2}{\gamma_1}\end{pmatrix}\begin{pmatrix}\frac{\alpha}{\gamma_1} & \frac{\beta}{\gamma_1} & \frac{\gamma}{\gamma_1}\end{pmatrix}$$

Grup 10

$$10\begin{pmatrix}\alpha_1 & \alpha_2\\ \alpha_1 & \beta_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\beta\alpha_2-\alpha\beta_2}{\alpha_1(\alpha_2-\beta_2)} & \frac{\gamma\alpha_2-\alpha\beta_2}{\alpha_1(\alpha_2-\beta_2)} & \frac{\alpha\alpha_2-\beta\beta_2}{\alpha_1(\alpha_2-\beta_2)} & \frac{\gamma\alpha_2-\beta\beta_2}{\alpha_1(\alpha_2-\beta_2)} & \frac{\alpha\alpha_2-\gamma\beta_2}{\alpha_1(\alpha_2-\beta_2)} & \frac{\beta\alpha_2-\gamma\beta_2}{\alpha_1(\alpha_2-\beta_2)}\\ \frac{\alpha-\beta}{\alpha_2-\beta_2} & \frac{\alpha-\gamma}{\alpha_2-\beta_2} & \frac{-\alpha+\beta}{\alpha_2-\beta_2} & \frac{\beta-\gamma}{\alpha_2-\beta_2} & \frac{-\alpha+\gamma}{\alpha_2-\beta_2} & \frac{-\beta+\gamma}{\alpha_2-\beta_2}\end{pmatrix}$$

Grup 11

$$11\begin{pmatrix}\alpha_1 & \alpha_2\\ \alpha_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\beta\alpha_2-\alpha\gamma_2}{\alpha_1(\alpha_2-\gamma_2)} & \frac{\gamma\alpha_2-\alpha\gamma_2}{\alpha_1(\alpha_2-\gamma_2)} & \frac{\alpha\alpha_2-\beta\gamma_2}{\alpha_1(\alpha_2-\gamma_2)} & \frac{\gamma\alpha_2-\beta\gamma_2}{\alpha_1(\alpha_2-\gamma_2)} & \frac{\alpha\alpha_2-\gamma\gamma_2}{\alpha_1(\alpha_2-\gamma_2)} & \frac{\beta\alpha_2-\gamma\gamma_2}{\alpha_1(\alpha_2-\gamma_2)}\\ \frac{\alpha-\beta}{\alpha_2-\gamma_2} & \frac{\alpha-\gamma}{\alpha_2-\gamma_2} & \frac{-\alpha+\beta}{\alpha_2-\gamma_2} & \frac{\beta-\gamma}{\alpha_2-\gamma_2} & \frac{-\alpha+\gamma}{\alpha_2-\gamma_2} & \frac{-\beta+\gamma}{\alpha_2-\gamma_2}\end{pmatrix}$$

Grup 12

$$12\begin{pmatrix}\alpha_1 & \alpha_2\\ \beta_1 & \alpha_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha-\beta}{\alpha_1-\beta_1} & \frac{\alpha-\gamma}{\alpha_1-\beta_1} & \frac{-\alpha+\beta}{\alpha_1-\beta_1} & \frac{\beta-\gamma}{\alpha_1-\beta_1} & \frac{-\alpha+\gamma}{\alpha_1-\beta_1} & \frac{-\beta+\gamma}{\alpha_1-\beta_1}\\ \frac{\beta\alpha_1-\alpha\beta_1}{\alpha_2(\alpha_1-\beta_1)} & \frac{\gamma\alpha_1-\alpha\beta_1}{\alpha_2(\alpha_1-\beta_1)} & \frac{\alpha\alpha_1-\beta\beta_1}{\alpha_2(\alpha_1-\beta_1)} & \frac{\gamma\alpha_1-\beta\beta_1}{\alpha_2(\alpha_1-\beta_1)} & \frac{\alpha\alpha_1-\gamma\beta_1}{\alpha_2(\alpha_1-\beta_1)} & \frac{\beta\alpha_1-\gamma\beta_1}{\alpha_2(\alpha_1-\beta_1)}\end{pmatrix}$$

Grup 13

$$13\begin{pmatrix}\alpha_1 & \alpha_2\\ \beta_1 & \beta_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{-\alpha\alpha_2+\alpha\beta_2}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{-\beta\alpha_2+\alpha\beta_2}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{-\gamma\alpha_2+\alpha\beta_2}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{-\alpha\alpha_2+\beta\beta_2}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{-\beta\alpha_2+\beta\beta_2}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{-\gamma\alpha_2+\beta\beta_2}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{-\alpha\alpha_2+\gamma\beta_2}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{-\beta\alpha_2+\gamma\beta_2}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{-\gamma\alpha_2+\gamma\beta_2}{-\alpha_2\beta_1+\alpha_1\beta_2}\\ \frac{\alpha\alpha_1-\alpha\beta_1}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{\beta\alpha_1-\alpha\beta_1}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{\gamma\alpha_1-\alpha\beta_1}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{\alpha\alpha_1-\beta\beta_1}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{\beta\alpha_1-\beta\beta_1}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{\gamma\alpha_1-\beta\beta_1}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{\alpha\alpha_1-\gamma\beta_1}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{\beta\alpha_1-\gamma\beta_1}{-\alpha_2\beta_1+\alpha_1\beta_2} & \frac{\gamma\alpha_1-\gamma\beta_1}{-\alpha_2\beta_1+\alpha_1\beta_2}\end{pmatrix}$$

Grup 14

$$14\begin{pmatrix}\alpha_1 & \alpha_2\\ \beta_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{-\alpha\alpha_2+\alpha\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{-\beta\alpha_2+\alpha\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{-\gamma\alpha_2+\alpha\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{-\alpha\alpha_2+\beta\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{-\beta\alpha_2+\beta\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{-\gamma\alpha_2+\beta\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{-\alpha\alpha_2+\gamma\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{-\beta\alpha_2+\gamma\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{-\gamma\alpha_2+\gamma\gamma_2}{-\alpha_2\beta_1+\alpha_1\gamma_2}\\ \frac{\alpha\alpha_1-\alpha\beta_1}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\alpha\beta_1}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\alpha\beta_1}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{\alpha\alpha_1-\beta\beta_1}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\beta\beta_1}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\beta\beta_1}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{\alpha\alpha_1-\gamma\beta_1}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\gamma\beta_1}{-\alpha_2\beta_1+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\gamma\beta_1}{-\alpha_2\beta_1+\alpha_1\gamma_2}\end{pmatrix}$$

Grup 15

$$15\begin{pmatrix}\alpha_1 & \alpha_2\\ \gamma_1 & \alpha_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha-\beta}{\alpha_1-\gamma_1} & \frac{\alpha-\gamma}{\alpha_1-\gamma_1} & \frac{-\alpha+\beta}{\alpha_1-\gamma_1} & \frac{\beta-\gamma}{\alpha_1-\gamma_1} & \frac{-\alpha+\gamma}{\alpha_1-\gamma_1} & \frac{-\beta+\gamma}{\alpha_1-\gamma_1}\\ \frac{\beta\alpha_1-\alpha\gamma_1}{\alpha_2(\alpha_1-\gamma_1)} & \frac{\gamma\alpha_1-\alpha\gamma_1}{\alpha_2(\alpha_1-\gamma_1)} & \frac{\alpha\alpha_1-\beta\gamma_1}{\alpha_2(\alpha_1-\gamma_1)} & \frac{\gamma\alpha_1-\beta\gamma_1}{\alpha_2(\alpha_1-\gamma_1)} & \frac{\alpha\alpha_1-\gamma\gamma_1}{\alpha_2(\alpha_1-\gamma_1)} & \frac{\beta\alpha_1-\gamma\gamma_1}{\alpha_2(\alpha_1-\gamma_1)}\end{pmatrix}$$

Grup 16

$$16\begin{pmatrix}\alpha_1 & \alpha_2\\ \gamma_1 & \beta_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{-\alpha\alpha_2+\alpha\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{-\beta\alpha_2+\alpha\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{-\gamma\alpha_2+\alpha\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{-\alpha\alpha_2+\beta\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{-\beta\alpha_2+\beta\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{-\gamma\alpha_2+\beta\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{-\alpha\alpha_2+\gamma\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{-\beta\alpha_2+\gamma\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{-\gamma\alpha_2+\gamma\beta_2}{\alpha_1\beta_2-\alpha_2\gamma_1}\\ \frac{\alpha\alpha_1-\alpha\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{\beta\alpha_1-\alpha\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{\gamma\alpha_1-\alpha\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{\alpha\alpha_1-\beta\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{\beta\alpha_1-\beta\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{\gamma\alpha_1-\beta\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{\alpha\alpha_1-\gamma\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{\beta\alpha_1-\gamma\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1} & \frac{\gamma\alpha_1-\gamma\gamma_1}{\alpha_1\beta_2-\alpha_2\gamma_1}\end{pmatrix}$$

Grup 17

$$17\begin{pmatrix}\alpha_1 & \alpha_2\\ \gamma_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{-\alpha\alpha_2+\alpha\gamma_2}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{-\beta\alpha_2+\alpha\gamma_2}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{-\gamma\alpha_2+\alpha\gamma_2}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{-\alpha\alpha_2+\beta\gamma_2}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{-\beta\alpha_2+\beta\gamma_2}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{-\gamma\alpha_2+\beta\gamma_2}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{-\alpha\alpha_2+\gamma\gamma_2}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{-\beta\alpha_2+\gamma\gamma_2}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{-\gamma\alpha_2+\gamma\gamma_2}{-\alpha_2\gamma_1+\alpha_1\gamma_2}\\ \frac{\alpha\alpha_1-\alpha\gamma_1}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\alpha\gamma_1}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\alpha\gamma_1}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{\alpha\alpha_1-\beta\gamma_1}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\beta\gamma_1}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\beta\gamma_1}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{\alpha\alpha_1-\gamma\gamma_1}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\gamma\gamma_1}{-\alpha_2\gamma_1+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\gamma\gamma_1}{-\alpha_2\gamma_1+\alpha_1\gamma_2}\end{pmatrix}$$

Grup 18

$$18\begin{pmatrix}\alpha_1 & \beta_2\\ \alpha_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\beta\beta_2-\alpha\gamma_2}{\alpha_1(\beta_2-\gamma_2)} & \frac{\gamma\beta_2-\alpha\gamma_2}{\alpha_1(\beta_2-\gamma_2)} & \frac{\alpha\beta_2-\beta\gamma_2}{\alpha_1(\beta_2-\gamma_2)} & \frac{\gamma\beta_2-\beta\gamma_2}{\alpha_1(\beta_2-\gamma_2)} & \frac{\alpha\beta_2-\gamma\gamma_2}{\alpha_1(\beta_2-\gamma_2)} & \frac{\beta\beta_2-\gamma\gamma_2}{\alpha_1(\beta_2-\gamma_2)}\\ \frac{\alpha-\beta}{\beta_2-\gamma_2} & \frac{\alpha-\gamma}{\beta_2-\gamma_2} & \frac{-\alpha+\beta}{\beta_2-\gamma_2} & \frac{\beta-\gamma}{\beta_2-\gamma_2} & \frac{-\alpha+\gamma}{\beta_2-\gamma_2} & \frac{-\beta+\gamma}{\beta_2-\gamma_2}\end{pmatrix}$$

Grup 19

$$19\begin{pmatrix}\alpha_1 & \beta_2\\ \beta_1 & \alpha_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha\alpha_2-\alpha\beta_2}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\alpha\alpha_2-\beta\beta_2}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\alpha\alpha_2-\gamma\beta_2}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\beta\alpha_2-\alpha\beta_2}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\beta\alpha_2-\beta\beta_2}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\beta\alpha_2-\gamma\beta_2}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\gamma\alpha_2-\alpha\beta_2}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\gamma\alpha_2-\beta\beta_2}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\gamma\alpha_2-\gamma\beta_2}{\alpha_1\alpha_2-\beta_1\beta_2}\\ \frac{\alpha\alpha_1-\alpha\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\beta\alpha_1-\alpha\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\gamma\alpha_1-\alpha\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\alpha\alpha_1-\beta\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\beta\alpha_1-\beta\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\gamma\alpha_1-\beta\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\alpha\alpha_1-\gamma\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\beta\alpha_1-\gamma\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2} & \frac{\gamma\alpha_1-\gamma\beta_1}{\alpha_1\alpha_2-\beta_1\beta_2}\end{pmatrix}$$

Grup 20

$$20\begin{pmatrix}\alpha_1 & \beta_2\\ \beta_1 & \beta_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha-\beta}{\alpha_1-\beta_1} & \frac{\alpha-\gamma}{\alpha_1-\beta_1} & \frac{-\alpha+\beta}{\alpha_1-\beta_1} & \frac{\beta-\gamma}{\alpha_1-\beta_1} & \frac{-\alpha+\gamma}{\alpha_1-\beta_1} & \frac{-\beta+\gamma}{\alpha_1-\beta_1}\\ \frac{\beta\alpha_1-\alpha\beta_1}{(\alpha_1-\beta_1)\beta_2} & \frac{\gamma\alpha_1-\alpha\beta_1}{(\alpha_1-\beta_1)\beta_2} & \frac{\alpha\alpha_1-\beta\beta_1}{(\alpha_1-\beta_1)\beta_2} & \frac{\gamma\alpha_1-\beta\beta_1}{(\alpha_1-\beta_1)\beta_2} & \frac{\alpha\alpha_1-\gamma\beta_1}{(\alpha_1-\beta_1)\beta_2} & \frac{\beta\alpha_1-\gamma\beta_1}{(\alpha_1-\beta_1)\beta_2}\end{pmatrix}$$

Grup 21

$$21\begin{pmatrix}\alpha_1 & \beta_2\\ \beta_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{-\alpha\beta_2+\alpha\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{-\beta\beta_2+\alpha\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{-\gamma\beta_2+\alpha\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{-\alpha\beta_2+\beta\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{-\beta\beta_2+\beta\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{-\gamma\beta_2+\beta\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{-\alpha\beta_2+\gamma\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{-\beta\beta_2+\gamma\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{-\gamma\beta_2+\gamma\gamma_2}{-\beta_1\beta_2+\alpha_1\gamma_2}\\ \frac{\alpha\alpha_1-\alpha\beta_1}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\alpha\beta_1}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\alpha\beta_1}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{\alpha\alpha_1-\beta\beta_1}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\beta\beta_1}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\beta\beta_1}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{\alpha\alpha_1-\gamma\beta_1}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\gamma\beta_1}{-\beta_1\beta_2+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\gamma\beta_1}{-\beta_1\beta_2+\alpha_1\gamma_2}\end{pmatrix}$$

Grup 22

$$22\begin{pmatrix}\alpha_1 & \beta_2\\ \gamma_1 & \alpha_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha\alpha_2-\alpha\beta_2}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\alpha\alpha_2-\beta\beta_2}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\alpha\alpha_2-\gamma\beta_2}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\beta\alpha_2-\alpha\beta_2}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\beta\alpha_2-\beta\beta_2}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\beta\alpha_2-\gamma\beta_2}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\gamma\alpha_2-\alpha\beta_2}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\gamma\alpha_2-\beta\beta_2}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\gamma\alpha_2-\gamma\beta_2}{\alpha_1\alpha_2-\beta_2\gamma_1}\\ \frac{\alpha\alpha_1-\alpha\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\beta\alpha_1-\alpha\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\gamma\alpha_1-\alpha\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\alpha\alpha_1-\beta\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\beta\alpha_1-\beta\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\gamma\alpha_1-\beta\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\alpha\alpha_1-\gamma\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\beta\alpha_1-\gamma\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1} & \frac{\gamma\alpha_1-\gamma\gamma_1}{\alpha_1\alpha_2-\beta_2\gamma_1}\end{pmatrix}$$

Grup 23

$$23\begin{pmatrix}\alpha_1 & \beta_2\\ \gamma_1 & \beta_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha-\beta}{\alpha_1-\gamma_1} & \frac{\alpha-\gamma}{\alpha_1-\gamma_1} & \frac{-\alpha+\beta}{\alpha_1-\gamma_1} & \frac{\beta-\gamma}{\alpha_1-\gamma_1} & \frac{-\alpha+\gamma}{\alpha_1-\gamma_1} & \frac{-\beta+\gamma}{\alpha_1-\gamma_1}\\ \frac{\beta\alpha_1-\alpha\gamma_1}{\beta_2(\alpha_1-\gamma_1)} & \frac{\gamma\alpha_1-\alpha\gamma_1}{\beta_2(\alpha_1-\gamma_1)} & \frac{\alpha\alpha_1-\beta\gamma_1}{\beta_2(\alpha_1-\gamma_1)} & \frac{\gamma\alpha_1-\beta\gamma_1}{\beta_2(\alpha_1-\gamma_1)} & \frac{\alpha\alpha_1-\gamma\gamma_1}{\beta_2(\alpha_1-\gamma_1)} & \frac{\beta\alpha_1-\gamma\gamma_1}{\beta_2(\alpha_1-\gamma_1)}\end{pmatrix}$$

Grup 24

$$24\begin{pmatrix}\alpha_1 & \beta_2\\ \gamma_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{-\alpha\beta_2+\alpha\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{-\beta\beta_2+\alpha\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{-\gamma\beta_2+\alpha\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{-\alpha\beta_2+\beta\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{-\beta\beta_2+\beta\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{-\gamma\beta_2+\beta\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{-\alpha\beta_2+\gamma\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{-\beta\beta_2+\gamma\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{-\gamma\beta_2+\gamma\gamma_2}{-\beta_2\gamma_1+\alpha_1\gamma_2}\\ \frac{\alpha\alpha_1-\alpha\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\alpha\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\alpha\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{\alpha\alpha_1-\beta\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\beta\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\beta\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{\alpha\alpha_1-\gamma\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{\beta\alpha_1-\gamma\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2} & \frac{\gamma\alpha_1-\gamma\gamma_1}{-\beta_2\gamma_1+\alpha_1\gamma_2}\end{pmatrix}$$

Grup 25

$$25\begin{pmatrix}\alpha_1 & \gamma_2\\ \beta_1 & \alpha_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha\alpha_2-\alpha\gamma_2}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\alpha\alpha_2-\beta\gamma_2}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\alpha\alpha_2-\gamma\gamma_2}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\beta\alpha_2-\alpha\gamma_2}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\beta\alpha_2-\beta\gamma_2}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\beta\alpha_2-\gamma\gamma_2}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\gamma\alpha_2-\alpha\gamma_2}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\gamma\alpha_2-\beta\gamma_2}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\gamma\alpha_2-\gamma\gamma_2}{\alpha_1\alpha_2-\beta_1\gamma_2}\\ \frac{\alpha\alpha_1-\alpha\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\beta\alpha_1-\alpha\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\gamma\alpha_1-\alpha\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\alpha\alpha_1-\beta\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\beta\alpha_1-\beta\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\gamma\alpha_1-\beta\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\alpha\alpha_1-\gamma\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\beta\alpha_1-\gamma\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2} & \frac{\gamma\alpha_1-\gamma\beta_1}{\alpha_1\alpha_2-\beta_1\gamma_2}\end{pmatrix}$$

Grup 26

$$26\begin{pmatrix}\alpha_1 & \gamma_2\\ \beta_1 & \beta_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha\beta_2-\alpha\gamma_2}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\alpha\beta_2-\beta\gamma_2}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\alpha\beta_2-\gamma\gamma_2}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\beta\beta_2-\alpha\gamma_2}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\beta\beta_2-\beta\gamma_2}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\beta\beta_2-\gamma\gamma_2}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\gamma\beta_2-\alpha\gamma_2}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\gamma\beta_2-\beta\gamma_2}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\gamma\beta_2-\gamma\gamma_2}{\alpha_1\beta_2-\beta_1\gamma_2}\\ \frac{\alpha\alpha_1-\alpha\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\beta\alpha_1-\alpha\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\gamma\alpha_1-\alpha\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\alpha\alpha_1-\beta\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\beta\alpha_1-\beta\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\gamma\alpha_1-\beta\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\alpha\alpha_1-\gamma\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\beta\alpha_1-\gamma\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2} & \frac{\gamma\alpha_1-\gamma\beta_1}{\alpha_1\beta_2-\beta_1\gamma_2}\end{pmatrix}$$

Grup 27

$$27\begin{pmatrix}\alpha_1 & \gamma_2\\ \beta_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha-\beta}{\alpha_1-\beta_1} & \frac{\alpha-\gamma}{\alpha_1-\beta_1} & \frac{-\alpha+\beta}{\alpha_1-\beta_1} & \frac{\beta-\gamma}{\alpha_1-\beta_1} & \frac{-\alpha+\gamma}{\alpha_1-\beta_1} & \frac{-\beta+\gamma}{\alpha_1-\beta_1}\\ \frac{\beta\alpha_1-\alpha\beta_1}{(\alpha_1-\beta_1)\gamma_2} & \frac{\gamma\alpha_1-\alpha\beta_1}{(\alpha_1-\beta_1)\gamma_2} & \frac{\alpha\alpha_1-\beta\beta_1}{(\alpha_1-\beta_1)\gamma_2} & \frac{\gamma\alpha_1-\beta\beta_1}{(\alpha_1-\beta_1)\gamma_2} & \frac{\alpha\alpha_1-\gamma\beta_1}{(\alpha_1-\beta_1)\gamma_2} & \frac{\beta\alpha_1-\gamma\beta_1}{(\alpha_1-\beta_1)\gamma_2}\end{pmatrix}$$

Grup 28

$$28\begin{pmatrix}\alpha_1&\gamma_2\\\gamma_1&\alpha_2\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{\alpha\alpha_2-\alpha\gamma_2}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\alpha\alpha_2-\beta\gamma_2}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\alpha\alpha_2-\gamma\gamma_2}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\beta\alpha_2-\alpha\gamma_2}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\beta\alpha_2-\beta\gamma_2}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\beta\alpha_2-\gamma\gamma_2}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\gamma\alpha_2-\alpha\gamma_2}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\gamma\alpha_2-\beta\gamma_2}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\gamma\alpha_2-\gamma\gamma_2}{\alpha_1\alpha_2-\gamma_1\gamma_2}\\\frac{\alpha\alpha_1-\alpha\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\beta\alpha_1-\alpha\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\gamma\alpha_1-\alpha\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\alpha\alpha_1-\beta\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\beta\alpha_1-\beta\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\gamma\alpha_1-\beta\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\alpha\alpha_1-\gamma\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\beta\alpha_1-\gamma\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}&\frac{\gamma\alpha_1-\gamma\gamma_1}{\alpha_1\alpha_2-\gamma_1\gamma_2}\end{pmatrix}$$

Grup 29

$$29\begin{pmatrix}\alpha_1&\gamma_2\\\gamma_1&\beta_2\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{\alpha\beta_2-\alpha\gamma_2}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\alpha\beta_2-\beta\gamma_2}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\alpha\beta_2-\gamma\gamma_2}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\beta\beta_2-\alpha\gamma_2}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\beta\beta_2-\beta\gamma_2}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\beta\beta_2-\gamma\gamma_2}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\gamma\beta_2-\alpha\gamma_2}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\gamma\beta_2-\beta\gamma_2}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\gamma\beta_2-\gamma\gamma_2}{\alpha_1\beta_2-\gamma_1\gamma_2}\\\frac{\alpha\alpha_1-\alpha\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\beta\alpha_1-\alpha\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\gamma\alpha_1-\alpha\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\alpha\alpha_1-\beta\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\beta\alpha_1-\beta\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\gamma\alpha_1-\beta\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\alpha\alpha_1-\gamma\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\beta\alpha_1-\gamma\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}&\frac{\gamma\alpha_1-\gamma\gamma_1}{\alpha_1\beta_2-\gamma_1\gamma_2}\end{pmatrix}$$

Grup 30

$$30\begin{pmatrix}\alpha_1&\gamma_2\\\gamma_1&\gamma_2\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{\alpha-\beta}{\alpha_1-\gamma_1}&\frac{\alpha-\gamma}{\alpha_1-\gamma_1}&\frac{-\alpha+\beta}{\alpha_1-\gamma_1}&\frac{\beta-\gamma}{\alpha_1-\gamma_1}&\frac{-\alpha+\gamma}{\alpha_1-\gamma_1}&\frac{-\beta+\gamma}{\alpha_1-\gamma_1}\\\frac{\beta\alpha_1-\alpha\gamma_1}{(\alpha_1-\gamma_1)\gamma_2}&\frac{\gamma\alpha_1-\alpha\gamma_1}{(\alpha_1-\gamma_1)\gamma_2}&\frac{\alpha\alpha_1-\beta\gamma_1}{(\alpha_1-\gamma_1)\gamma_2}&\frac{\gamma\alpha_1-\beta\gamma_1}{(\alpha_1-\gamma_1)\gamma_2}&\frac{\alpha\alpha_1-\gamma\gamma_1}{(\alpha_1-\gamma_1)\gamma_2}&\frac{\beta\alpha_1-\gamma\gamma_1}{(\alpha_1-\gamma_1)\gamma_2}\end{pmatrix}$$

Grup 31

$$31\begin{pmatrix}\beta_1&\alpha_2\\\beta_1&\beta_2\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{\beta\alpha_2-\alpha\beta_2}{\beta_1(\alpha_2-\beta_2)}&\frac{\gamma\alpha_2-\alpha\beta_2}{\beta_1(\alpha_2-\beta_2)}&\frac{\alpha\alpha_2-\beta\beta_2}{\beta_1(\alpha_2-\beta_2)}&\frac{\gamma\alpha_2-\beta\beta_2}{\beta_1(\alpha_2-\beta_2)}&\frac{\alpha\alpha_2-\gamma\beta_2}{\beta_1(\alpha_2-\beta_2)}&\frac{\beta\alpha_2-\gamma\beta_2}{\beta_1(\alpha_2-\beta_2)}\\\frac{\alpha-\beta}{\alpha_2-\beta_2}&\frac{\alpha-\gamma}{\alpha_2-\beta_2}&\frac{-\alpha+\beta}{\alpha_2-\beta_2}&\frac{\beta-\gamma}{\alpha_2-\beta_2}&\frac{-\alpha+\gamma}{\alpha_2-\beta_2}&\frac{-\beta+\gamma}{\alpha_2-\beta_2}\end{pmatrix}$$

Grup 32

$$32\begin{pmatrix}\beta_1&\alpha_2\\\beta_1&\gamma_2\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{\beta\alpha_2-\alpha\gamma_2}{\beta_1(\alpha_2-\gamma_2)}&\frac{\gamma\alpha_2-\alpha\gamma_2}{\beta_1(\alpha_2-\gamma_2)}&\frac{\alpha\alpha_2-\beta\gamma_2}{\beta_1(\alpha_2-\gamma_2)}&\frac{\gamma\alpha_2-\beta\gamma_2}{\beta_1(\alpha_2-\gamma_2)}&\frac{\alpha\alpha_2-\gamma\gamma_2}{\beta_1(\alpha_2-\gamma_2)}&\frac{\beta\alpha_2-\gamma\gamma_2}{\beta_1(\alpha_2-\gamma_2)}\\\frac{\alpha-\beta}{\alpha_2-\gamma_2}&\frac{\alpha-\gamma}{\alpha_2-\gamma_2}&\frac{-\alpha+\beta}{\alpha_2-\gamma_2}&\frac{\beta-\gamma}{\alpha_2-\gamma_2}&\frac{-\alpha+\gamma}{\alpha_2-\gamma_2}&\frac{-\beta+\gamma}{\alpha_2-\gamma_2}\end{pmatrix}$$

Grup 33

$$33\begin{pmatrix}\beta_1&\alpha_2\\\gamma_1&\alpha_2\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{\alpha-\beta}{\beta_1-\gamma_1}&\frac{\alpha-\gamma}{\beta_1-\gamma_1}&\frac{-\alpha+\beta}{\beta_1-\gamma_1}&\frac{\beta-\gamma}{\beta_1-\gamma_1}&\frac{-\alpha+\gamma}{\beta_1-\gamma_1}&\frac{-\beta+\gamma}{\beta_1-\gamma_1}\\\frac{\beta\beta_1-\alpha\gamma_1}{\alpha_2(\beta_1-\gamma_1)}&\frac{\gamma\beta_1-\alpha\gamma_1}{\alpha_2(\beta_1-\gamma_1)}&\frac{\alpha\beta_1-\beta\gamma_1}{\alpha_2(\beta_1-\gamma_1)}&\frac{\gamma\beta_1-\beta\gamma_1}{\alpha_2(\beta_1-\gamma_1)}&\frac{\alpha\beta_1-\gamma\gamma_1}{\alpha_2(\beta_1-\gamma_1)}&\frac{\beta\beta_1-\gamma\gamma_1}{\alpha_2(\beta_1-\gamma_1)}\end{pmatrix}$$

Grup 34

$$34\begin{pmatrix}\beta_1&\alpha_2\\\gamma_1&\beta_2\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{-\alpha\alpha_2+\alpha\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{-\beta\alpha_2+\alpha\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{-\gamma\alpha_2+\alpha\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{-\alpha\alpha_2+\beta\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{-\beta\alpha_2+\beta\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{-\gamma\alpha_2+\beta\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{-\alpha\alpha_2+\gamma\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{-\beta\alpha_2+\gamma\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{-\gamma\alpha_2+\gamma\beta_2}{\beta_1\beta_2-\alpha_2\gamma_1}\\\frac{\alpha\beta_1-\alpha\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{\beta\beta_1-\alpha\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{\gamma\beta_1-\alpha\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{\alpha\beta_1-\beta\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{\beta\beta_1-\beta\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{\gamma\beta_1-\beta\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{\alpha\beta_1-\gamma\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{\beta\beta_1-\gamma\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}&\frac{\gamma\beta_1-\gamma\gamma_1}{\beta_1\beta_2-\alpha_2\gamma_1}\end{pmatrix}$$

Grup 35

$$35\begin{pmatrix}\beta_1&\alpha_2\\\gamma_1&\gamma_2\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{-\alpha\alpha_2+\alpha\gamma_2}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{-\beta\alpha_2+\alpha\gamma_2}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{-\gamma\alpha_2+\alpha\gamma_2}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{-\alpha\alpha_2+\beta\gamma_2}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{-\beta\alpha_2+\beta\gamma_2}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{-\gamma\alpha_2+\beta\gamma_2}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{-\alpha\alpha_2+\gamma\gamma_2}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{-\beta\alpha_2+\gamma\gamma_2}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{-\gamma\alpha_2+\gamma\gamma_2}{-\alpha_2\gamma_1+\beta_1\gamma_2}\\\frac{\alpha\beta_1-\alpha\gamma_1}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{\beta\beta_1-\alpha\gamma_1}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{\gamma\beta_1-\alpha\gamma_1}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{\alpha\beta_1-\beta\gamma_1}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{\beta\beta_1-\beta\gamma_1}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{\gamma\beta_1-\beta\gamma_1}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{\alpha\beta_1-\gamma\gamma_1}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{\beta\beta_1-\gamma\gamma_1}{-\alpha_2\gamma_1+\beta_1\gamma_2}&\frac{\gamma\beta_1-\gamma\gamma_1}{-\alpha_2\gamma_1+\beta_1\gamma_2}\end{pmatrix}$$

Grup 36

$$36\begin{pmatrix}\beta_1&\beta_2\\\beta_1&\gamma_2\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{\beta\beta_2-\alpha\gamma_2}{\beta_1(\beta_2-\gamma_2)}&\frac{\gamma\beta_2-\alpha\gamma_2}{\beta_1(\beta_2-\gamma_2)}&\frac{\alpha\beta_2-\beta\gamma_2}{\beta_1(\beta_2-\gamma_2)}&\frac{\gamma\beta_2-\beta\gamma_2}{\beta_1(\beta_2-\gamma_2)}&\frac{\alpha\beta_2-\gamma\gamma_2}{\beta_1(\beta_2-\gamma_2)}&\frac{\beta\beta_2-\gamma\gamma_2}{\beta_1(\beta_2-\gamma_2)}\\\frac{\alpha-\beta}{\beta_2-\gamma_2}&\frac{\alpha-\gamma}{\beta_2-\gamma_2}&\frac{-\alpha+\beta}{\beta_2-\gamma_2}&\frac{\beta-\gamma}{\beta_2-\gamma_2}&\frac{-\alpha+\gamma}{\beta_2-\gamma_2}&\frac{-\beta+\gamma}{\beta_2-\gamma_2}\end{pmatrix}$$

Grup 37

$$37\begin{pmatrix}\beta_1&\beta_2\\\gamma_1&\alpha_2\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{\alpha\alpha_2-\alpha\beta_2}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\alpha\alpha_2-\beta\beta_2}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\alpha\alpha_2-\gamma\beta_2}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\beta\alpha_2-\alpha\beta_2}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\beta\alpha_2-\beta\beta_2}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\beta\alpha_2-\gamma\beta_2}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\gamma\alpha_2-\alpha\beta_2}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\gamma\alpha_2-\beta\beta_2}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\gamma\alpha_2-\gamma\beta_2}{\alpha_2\beta_1-\beta_2\gamma_1}\\\frac{\alpha\beta_1-\alpha\gamma_1}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\beta\beta_1-\alpha\gamma_1}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\gamma\beta_1-\alpha\gamma_1}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\alpha\beta_1-\beta\gamma_1}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\beta\beta_1-\beta\gamma_1}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\gamma\beta_1-\beta\gamma_1}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\alpha\beta_1-\gamma\gamma_1}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\beta\beta_1-\gamma\gamma_1}{\alpha_2\beta_1-\beta_2\gamma_1}&\frac{\gamma\beta_1-\gamma\gamma_1}{\alpha_2\beta_1-\beta_2\gamma_1}\end{pmatrix}$$

Grup 38

$$38\begin{pmatrix}\beta_1 & \beta_2\\ \gamma_1 & \beta_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha-\beta}{\beta_1-\gamma_1} & \frac{\alpha-\gamma}{\beta_1-\gamma_1} & \frac{-\alpha+\beta}{\beta_1-\gamma_1} & \frac{\beta-\gamma}{\beta_1-\gamma_1} & \frac{-\alpha+\gamma}{\beta_1-\gamma_1} & \frac{-\beta+\gamma}{\beta_1-\gamma_1}\\ \frac{\beta\beta_1-\alpha\gamma_1}{\beta_2(\beta_1-\gamma_1)} & \frac{\gamma\beta_1-\alpha\gamma_1}{\beta_2(\beta_1-\gamma_1)} & \frac{\alpha\beta_1-\beta\gamma_1}{\beta_2(\beta_1-\gamma_1)} & \frac{\gamma\beta_1-\beta\gamma_1}{\beta_2(\beta_1-\gamma_1)} & \frac{\alpha\beta_1-\gamma\gamma_1}{\beta_2(\beta_1-\gamma_1)} & \frac{\beta\beta_1-\gamma\gamma_1}{\beta_2(\beta_1-\gamma_1)}\end{pmatrix}$$

Grup 39

$$39\begin{pmatrix}\beta_1 & \beta_2\\ \gamma_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{-\alpha\beta_2+\alpha\gamma_2}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{-\beta\beta_2+\alpha\gamma_2}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{-\gamma\beta_2+\alpha\gamma_2}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{-\alpha\beta_2+\beta\gamma_2}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{-\beta\beta_2+\beta\gamma_2}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{-\gamma\beta_2+\beta\gamma_2}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{-\alpha\beta_2+\gamma\gamma_2}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{-\beta\beta_2+\gamma\gamma_2}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{-\gamma\beta_2+\gamma\gamma_2}{-\beta_2\gamma_1+\beta_1\gamma_2}\\ \frac{\alpha\beta_1-\alpha\gamma_1}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{\beta\beta_1-\alpha\gamma_1}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{\gamma\beta_1-\alpha\gamma_1}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{\alpha\beta_1-\beta\gamma_1}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{\beta\beta_1-\beta\gamma_1}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{\gamma\beta_1-\beta\gamma_1}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{\alpha\beta_1-\gamma\gamma_1}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{\beta\beta_1-\gamma\gamma_1}{-\beta_2\gamma_1+\beta_1\gamma_2} & \frac{\gamma\beta_1-\gamma\gamma_1}{-\beta_2\gamma_1+\beta_1\gamma_2}\end{pmatrix}$$

Grup 40

$$40\begin{pmatrix}\beta_1 & \gamma_2\\ \gamma_1 & \alpha_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha\alpha_2-\alpha\gamma_2}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\alpha\alpha_2-\beta\gamma_2}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\alpha\alpha_2-\gamma\gamma_2}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\beta\alpha_2-\alpha\gamma_2}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\beta\alpha_2-\beta\gamma_2}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\beta\alpha_2-\gamma\gamma_2}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\gamma\alpha_2-\alpha\gamma_2}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\gamma\alpha_2-\beta\gamma_2}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\gamma\alpha_2-\gamma\gamma_2}{\alpha_2\beta_1-\gamma_1\gamma_2}\\ \frac{\alpha\beta_1-\alpha\gamma_1}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\beta\beta_1-\alpha\gamma_1}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\gamma\beta_1-\alpha\gamma_1}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\alpha\beta_1-\beta\gamma_1}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\beta\beta_1-\beta\gamma_1}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\gamma\beta_1-\beta\gamma_1}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\alpha\beta_1-\gamma\gamma_1}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\beta\beta_1-\gamma\gamma_1}{\alpha_2\beta_1-\gamma_1\gamma_2} & \frac{\gamma\beta_1-\gamma\gamma_1}{\alpha_2\beta_1-\gamma_1\gamma_2}\end{pmatrix}$$

Grup 41

$$41\begin{pmatrix}\beta_1 & \gamma_2\\ \gamma_1 & \beta_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha\beta_2-\alpha\gamma_2}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\alpha\beta_2-\beta\gamma_2}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\alpha\beta_2-\gamma\gamma_2}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\beta\beta_2-\alpha\gamma_2}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\beta\beta_2-\beta\gamma_2}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\beta\beta_2-\gamma\gamma_2}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\gamma\beta_2-\alpha\gamma_2}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\gamma\beta_2-\beta\gamma_2}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\gamma\beta_2-\gamma\gamma_2}{\beta_1\beta_2-\gamma_1\gamma_2}\\ \frac{\alpha\beta_1-\alpha\gamma_1}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\beta\beta_1-\alpha\gamma_1}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\gamma\beta_1-\alpha\gamma_1}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\alpha\beta_1-\beta\gamma_1}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\beta\beta_1-\beta\gamma_1}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\gamma\beta_1-\beta\gamma_1}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\alpha\beta_1-\gamma\gamma_1}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\beta\beta_1-\gamma\gamma_1}{\beta_1\beta_2-\gamma_1\gamma_2} & \frac{\gamma\beta_1-\gamma\gamma_1}{\beta_1\beta_2-\gamma_1\gamma_2}\end{pmatrix}$$

Grup 42

$$42\begin{pmatrix}\beta_1 & \gamma_2\\ \gamma_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\alpha-\beta}{\beta_1-\gamma_1} & \frac{\alpha-\gamma}{\beta_1-\gamma_1} & \frac{-\alpha+\beta}{\beta_1-\gamma_1} & \frac{\beta-\gamma}{\beta_1-\gamma_1} & \frac{-\alpha+\gamma}{\beta_1-\gamma_1} & \frac{-\beta+\gamma}{\beta_1-\gamma_1}\\ \frac{\beta\beta_1-\alpha\gamma_1}{(\beta_1-\gamma_1)\gamma_2} & \frac{\gamma\beta_1-\alpha\gamma_1}{(\beta_1-\gamma_1)\gamma_2} & \frac{\alpha\beta_1-\beta\gamma_1}{(\beta_1-\gamma_1)\gamma_2} & \frac{\gamma\beta_1-\beta\gamma_1}{(\beta_1-\gamma_1)\gamma_2} & \frac{\alpha\beta_1-\gamma\gamma_1}{(\beta_1-\gamma_1)\gamma_2} & \frac{\beta\beta_1-\gamma\gamma_1}{(\beta_1-\gamma_1)\gamma_2}\end{pmatrix}$$

Grup 43

$$43\begin{pmatrix}\gamma_1 & \alpha_2\\ \gamma_1 & \beta_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\beta\alpha_2-\alpha\beta_2}{(\alpha_2-\beta_2)\gamma_1} & \frac{\gamma\alpha_2-\alpha\beta_2}{(\alpha_2-\beta_2)\gamma_1} & \frac{\alpha\alpha_2-\beta\beta_2}{(\alpha_2-\beta_2)\gamma_1} & \frac{\gamma\alpha_2-\beta\beta_2}{(\alpha_2-\beta_2)\gamma_1} & \frac{\alpha\alpha_2-\gamma\beta_2}{(\alpha_2-\beta_2)\gamma_1} & \frac{\beta\alpha_2-\gamma\beta_2}{(\alpha_2-\beta_2)\gamma_1}\\ \frac{\alpha-\beta}{\alpha_2-\beta_2} & \frac{\alpha-\gamma}{\alpha_2-\beta_2} & \frac{-\alpha+\beta}{\alpha_2-\beta_2} & \frac{\beta-\gamma}{\alpha_2-\beta_2} & \frac{-\alpha+\gamma}{\alpha_2-\beta_2} & \frac{-\beta+\gamma}{\alpha_2-\beta_2}\end{pmatrix}$$

Grup 44

$$44\begin{pmatrix}\gamma_1 & \alpha_2\\ \gamma_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\beta\alpha_2-\alpha\gamma_2}{\gamma_1(\alpha_2-\gamma_2)} & \frac{\gamma\alpha_2-\alpha\gamma_2}{\gamma_1(\alpha_2-\gamma_2)} & \frac{\alpha\alpha_2-\beta\gamma_2}{\gamma_1(\alpha_2-\gamma_2)} & \frac{\gamma\alpha_2-\beta\gamma_2}{\gamma_1(\alpha_2-\gamma_2)} & \frac{\alpha\alpha_2-\gamma\gamma_2}{\gamma_1(\alpha_2-\gamma_2)} & \frac{\beta\alpha_2-\gamma\gamma_2}{\gamma_1(\alpha_2-\gamma_2)}\\ \frac{\alpha-\beta}{\alpha_2-\gamma_2} & \frac{\alpha-\gamma}{\alpha_2-\gamma_2} & \frac{-\alpha+\beta}{\alpha_2-\gamma_2} & \frac{\beta-\gamma}{\alpha_2-\gamma_2} & \frac{-\alpha+\gamma}{\alpha_2-\gamma_2} & \frac{-\beta+\gamma}{\alpha_2-\gamma_2}\end{pmatrix}$$

Grup 45

$$45\begin{pmatrix}\gamma_1 & \beta_2\\ \gamma_1 & \gamma_2\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{\beta\beta_2-\alpha\gamma_2}{\gamma_1(\beta_2-\gamma_2)} & \frac{\gamma\beta_2-\alpha\gamma_2}{\gamma_1(\beta_2-\gamma_2)} & \frac{\alpha\beta_2-\beta\gamma_2}{\gamma_1(\beta_2-\gamma_2)} & \frac{\gamma\beta_2-\beta\gamma_2}{\gamma_1(\beta_2-\gamma_2)} & \frac{\alpha\beta_2-\gamma\gamma_2}{\gamma_1(\beta_2-\gamma_2)} & \frac{\beta\beta_2-\gamma\gamma_2}{\gamma_1(\beta_2-\gamma_2)}\\ \frac{\alpha-\beta}{\beta_2-\gamma_2} & \frac{\alpha-\gamma}{\beta_2-\gamma_2} & \frac{-\alpha+\beta}{\beta_2-\gamma_2} & \frac{\beta-\gamma}{\beta_2-\gamma_2} & \frac{-\alpha+\gamma}{\beta_2-\gamma_2} & \frac{-\beta+\gamma}{\beta_2-\gamma_2}\end{pmatrix}$$

Teorem 4.2’nin çıktıları

Grup 1

$$1\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}\left(-1+i\sqrt{3}\right) & \frac{1}{2}\left(-1-i\sqrt{3}\right) & 0\end{pmatrix}$$

$6\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 0\end{pmatrix}$

$11\begin{pmatrix}1 & 1\end{pmatrix}\begin{pmatrix}1 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 0\end{pmatrix}$

Grup 2

$2\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 0\end{pmatrix}$

$7\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 0\end{pmatrix}$

$9\begin{pmatrix}1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 0\end{pmatrix}$

Grup 3

$3\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 0\end{pmatrix}$

$5\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 0\end{pmatrix}$

$10\begin{pmatrix}1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 0\end{pmatrix}$

Grup 4

$16\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}}\\ \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{i}{\sqrt{3}}\end{pmatrix}$

$17\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3-i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3})\\ \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3})\end{pmatrix}$

$19\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{i}{\sqrt{3}}\\ \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}}\end{pmatrix}$

$21\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3})\\ \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3})\end{pmatrix}$

$23\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3})\\ \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3-i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3})\end{pmatrix}$

$24\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3})\\ \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3})\end{pmatrix}$

$33\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{i}{\sqrt{3}}\\ -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3})\end{pmatrix}$

$38\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3})\\ -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3})\end{pmatrix}$

$45\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3})\\ -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{i}{\sqrt{3}}\end{pmatrix}$

$50\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\\ 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3})\\ -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3})\end{pmatrix}$

$66\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}-1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3})\\ \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{i}{\sqrt{3}}\end{pmatrix}$

$71\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}-1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3})\\ \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3})\end{pmatrix}$

$76\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}-1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3})\\ \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3})\end{pmatrix}$

$$78\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}-1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3})\\ \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3})\end{pmatrix}$$

$$79\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3})\\ -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3})\end{pmatrix}$$

$$88\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\\ 1 & 1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3})\\ \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3})\end{pmatrix}$$

$$101\begin{pmatrix}1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 1 & 1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}-1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3})\\ \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3})\end{pmatrix}$$

$$106\begin{pmatrix}1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 1 & 1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(1+i\sqrt{3}) & \frac{i}{\sqrt{3}} & -1 & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3}) & \frac{1}{6}(-3+i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{6}(3+i\sqrt{3})\\ \frac{1}{2}(1-i\sqrt{3}) & -\frac{i}{\sqrt{3}} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{6}(3+i\sqrt{3}) & -1 & \frac{1}{6}(-3+i\sqrt{3}) & \frac{i}{\sqrt{3}} & \frac{1}{6}(-3-i\sqrt{3}) & \frac{1}{6}(3-i\sqrt{3})\end{pmatrix}$$

Grup 5

$$18\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\end{pmatrix}$$

$$22\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\\ \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\end{pmatrix}$$

$$26\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 1 & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\\ \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\end{pmatrix}$$

$$27\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\\ \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$28\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\\ \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$29\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 0 & 1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\\ \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

$$56\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & -1 & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(1+i\sqrt{3})\end{pmatrix}$$

$$61\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\\ 1 & 1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -1 & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\end{pmatrix}$$

$$77\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\\ \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\end{pmatrix}$$

$$81\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 1 & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\\ -i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\end{pmatrix}$$

$$82\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\\ 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$83\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\\ 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$84\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 0 & 1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}-i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\\ \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

$$95\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\\ 1 & 1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3})\\ i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -1 & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3})\end{pmatrix}$$

$$111\begin{pmatrix}1 & 1\\ 1 & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\\ i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\end{pmatrix}$$

$$112\begin{pmatrix}1 & 1\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\\ 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$113\begin{pmatrix}1 & 1\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\\ \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$114\begin{pmatrix}1&1\\0&1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}i\sqrt{3}&\tfrac{1}{2}(-3+i\sqrt{3})&-i\sqrt{3}&\tfrac{1}{2}(-3-i\sqrt{3})&\tfrac{1}{2}(3-i\sqrt{3})&\tfrac{1}{2}(3+i\sqrt{3})&\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{2}(1+i\sqrt{3})&-1\\\tfrac{1}{2}(-1-i\sqrt{3})&1&\tfrac{1}{2}(-1+i\sqrt{3})&1&\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})&\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})&1\end{pmatrix}$$

Grup 6

$$20\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2}&-\frac{1}{2}+\frac{i\sqrt{3}}{2}\\-\frac{1}{2}-\frac{i\sqrt{3}}{2}&-\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&1\\0&0\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}(-1+i\sqrt{3})&\frac{1}{2}(-1-i\sqrt{3})&0\\0&0&0&0\end{pmatrix}$$

$$25\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2}&-\frac{1}{2}+\frac{i\sqrt{3}}{2}\\1&1\end{pmatrix}\begin{pmatrix}1&1\\0&0\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}(-1+i\sqrt{3})&\frac{1}{2}(-1-i\sqrt{3})&0\\0&0&0&0\end{pmatrix}$$

$$80\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2}&-\frac{1}{2}-\frac{i\sqrt{3}}{2}\\1&1\end{pmatrix}\begin{pmatrix}1&1\\0&0\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3})&1&\frac{1}{2}(-1+i\sqrt{3})&0\\0&0&0&0\end{pmatrix}$$

Grup 7

$$30\begin{pmatrix}-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\\-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&-1&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&\tfrac{1}{6}(-3+i\sqrt{3})&-\tfrac{i}{\sqrt{3}}\\\tfrac{1}{2}(1-i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&-1&\tfrac{1}{6}(-3+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})\end{pmatrix}$$

$$32\begin{pmatrix}-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\\-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}&-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&-1&\tfrac{1}{6}(-3-i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(3+i\sqrt{3})&\tfrac{1}{6}(-3+i\sqrt{3})\\\tfrac{1}{2}(1-i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&-1&\tfrac{1}{6}(-3+i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(-3-i\sqrt{3})\end{pmatrix}$$

$$37\begin{pmatrix}-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\\1&-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&-1&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(-3+i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(3+i\sqrt{3})\\\tfrac{1}{2}(1-i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&-1&\tfrac{1}{6}(-3+i\sqrt{3})&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{i}{\sqrt{3}}\end{pmatrix}$$

$$46\begin{pmatrix}-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&1\\-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}&1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&-1&\tfrac{1}{6}(-3+i\sqrt{3})&\tfrac{1}{2}(1-i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{i}{\sqrt{3}}\\\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&-1&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{1}{6}(-3+i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(3+i\sqrt{3})\end{pmatrix}$$

$$48\begin{pmatrix}-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&1\\1&-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&-1&\tfrac{1}{6}(-3+i\sqrt{3})&\tfrac{1}{2}(1-i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})\\\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&-1&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&\tfrac{1}{6}(-3+i\sqrt{3})&-\tfrac{i}{\sqrt{3}}\end{pmatrix}$$

$$67\begin{pmatrix}-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}&-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\\-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}&1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(1-i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&-1&\tfrac{1}{6}(-3+i\sqrt{3})&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{i}{\sqrt{3}}\\\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&-1&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(-3+i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(3+i\sqrt{3})\end{pmatrix}$$

$$69\begin{pmatrix}-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}&-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\\1&-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(1-i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&-1&\tfrac{1}{6}(-3+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})\\\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&-1&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&\tfrac{1}{6}(-3+i\sqrt{3})&-\tfrac{i}{\sqrt{3}}\end{pmatrix}$$

$$87\begin{pmatrix}-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}&1\\1&-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}-1&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(-3+i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(3+i\sqrt{3})\\-1&\tfrac{1}{6}(-3+i\sqrt{3})&\tfrac{1}{2}(1-i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{i}{\sqrt{3}}\end{pmatrix}$$

$$100\begin{pmatrix}1&-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\\1&-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{i}{\sqrt{3}}&-1&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{1}{6}(-3+i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(3+i\sqrt{3})\\\tfrac{1}{2}(1+i\sqrt{3})&\tfrac{1}{6}(3+i\sqrt{3})&-1&\tfrac{1}{6}(-3+i\sqrt{3})&\tfrac{1}{2}(1-i\sqrt{3})&-\tfrac{i}{\sqrt{3}}&\tfrac{1}{6}(-3-i\sqrt{3})&\tfrac{1}{6}(3-i\sqrt{3})&\tfrac{i}{\sqrt{3}}\end{pmatrix}$$

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$$31\begin{pmatrix}-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\\-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})&1&\tfrac{1}{2}(-1-i\sqrt{3})&1&\tfrac{1}{2}(-1+i\sqrt{3})&1&\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})\\\tfrac{1}{2}(-3-i\sqrt{3})&-i\sqrt{3}&\tfrac{1}{2}(3+i\sqrt{3})&\tfrac{1}{2}(3-i\sqrt{3})&i\sqrt{3}&\tfrac{1}{2}(-3+i\sqrt{3})&\tfrac{1}{2}(1+i\sqrt{3})&-1&\tfrac{1}{2}(1-i\sqrt{3})\end{pmatrix}$$

$$35\begin{pmatrix}-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\\-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}&0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(-1-i\sqrt{3})&\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})&1&1&\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})&1&\tfrac{1}{2}(-1+i\sqrt{3})\\-i\sqrt{3}&\tfrac{1}{2}(-3-i\sqrt{3})&\tfrac{1}{2}(3-i\sqrt{3})&\tfrac{1}{2}(3+i\sqrt{3})&i\sqrt{3}&\tfrac{1}{2}(-3+i\sqrt{3})&\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{2}(1+i\sqrt{3})&-1\end{pmatrix}$$

$$39\begin{pmatrix}-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&-\tfrac{1}{2}-\tfrac{i\sqrt{3}}{2}\\1&0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})&1&\tfrac{1}{2}(-1+i\sqrt{3})&1&\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})&1\\\tfrac{1}{2}(-3-i\sqrt{3})&-i\sqrt{3}&\tfrac{1}{2}(3-i\sqrt{3})&\tfrac{1}{2}(3+i\sqrt{3})&\tfrac{1}{2}(-3+i\sqrt{3})&i\sqrt{3}&-1&\tfrac{1}{2}(1-i\sqrt{3})&\tfrac{1}{2}(1+i\sqrt{3})\end{pmatrix}$$

$$52\begin{pmatrix}-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}&1\\0&-\tfrac{1}{2}+\tfrac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\tfrac{1}{2}(3+i\sqrt{3})&\tfrac{1}{2}(3-i\sqrt{3})&i\sqrt{3}&\tfrac{1}{2}(-3+i\sqrt{3})&\tfrac{1}{2}(-3-i\sqrt{3})&-i\sqrt{3}&\tfrac{1}{2}(1+i\sqrt{3})&-1&\tfrac{1}{2}(1-i\sqrt{3})\\1&\tfrac{1}{2}(-1-i\sqrt{3})&1&\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})&1&\tfrac{1}{2}(-1+i\sqrt{3})&\tfrac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$53\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\\ \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$54\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\\ \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

$$57\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -1 & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3})\end{pmatrix}$$

$$59\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\\ 1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -1 & \frac{1}{2}(3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(1-i\sqrt{3})\end{pmatrix}$$

$$73\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\\ \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$74\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}-i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\\ \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$75\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\\ \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

$$85\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\\ i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\end{pmatrix}$$

$$89\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\\ 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\\ \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\end{pmatrix}$$

$$93\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\\ 1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3})\\ \frac{1}{2}(3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -1\end{pmatrix}$$

$$102\begin{pmatrix}1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\\ \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\end{pmatrix}$$

$$108\begin{pmatrix}1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\\ 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$109\begin{pmatrix}1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\\ 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$110\begin{pmatrix}1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\\ \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

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$$34\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3})\\ 0 & 0\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 0\\ 0 & 0 & 0 & 0\end{pmatrix}$$

$$36\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3})\\ 0 & 0\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 0\\ 0 & 0 & 0 & 0\end{pmatrix}$$

$$86\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\\ 1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3})\\ 0 & 0\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 0\\ 0 & 0 & 0 & 0\end{pmatrix}$$

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$$40\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\\ 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$41\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\\ 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$42\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 0 & 1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\\ \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

$$43\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\\ -\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\end{pmatrix}$$

$$47\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\\ \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\end{pmatrix}$$

$$51\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\\ 1 & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\\ i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\end{pmatrix}$$

$$55\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ \frac{1}{2}(3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -1\end{pmatrix}$$

$$60\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\\ 1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(1+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & -1\end{pmatrix}$$

$$68\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\\ \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\end{pmatrix}$$

$$72\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 1 & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\\ \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\end{pmatrix}$$

$$90\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}-i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\\ 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$91\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\\ \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$92\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 1\\ 0 & 1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\\ \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

$$94\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\\ 1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3})\\ \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(-3+i\sqrt{3}) & -1 & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(1+i\sqrt{3})\end{pmatrix}$$

$$103\begin{pmatrix}1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1\\ \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$104\begin{pmatrix}1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-3+i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(3+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3})\\ \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$105\begin{pmatrix}1 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 0 & 1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\\ \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

$$107\begin{pmatrix}1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\\ 1 & 0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\\ \frac{1}{2}(-3-i\sqrt{3}) & -i\sqrt{3} & \frac{1}{2}(3+i\sqrt{3}) & \frac{1}{2}(3-i\sqrt{3}) & i\sqrt{3} & \frac{1}{2}(-3+i\sqrt{3}) & \frac{1}{2}(1+i\sqrt{3}) & -1 & \frac{1}{2}(1-i\sqrt{3})\end{pmatrix}$$

Grup 11

$$44\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\\ -\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1-i\sqrt{3})\\ 0 & 0\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 0\\ 0 & 0 & 0 & 0\end{pmatrix}$$

$$49\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 1\\ 1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1-i\sqrt{3})\\ 0 & 0\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 0\\ 0 & 0 & 0 & 0\end{pmatrix}$$

$$70\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\\ 1 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2}(-1-i\sqrt{3})\\ 0 & 0\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & 0\\ 0 & 0 & 0 & 0\end{pmatrix}$$

Grup 12

$$63\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$64\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$65\begin{pmatrix}-\frac{1}{2}+\frac{i\sqrt{3}}{2} & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\\ \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

$$97\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3})\\ 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$98\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3})\\ \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$99\begin{pmatrix}-\frac{1}{2}-\frac{i\sqrt{3}}{2} & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3})\\ \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

$$115\begin{pmatrix}1 & 0\\ 0 & -\frac{1}{2}+\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & 1\\ 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3})\end{pmatrix}$$

$$116\begin{pmatrix}1 & 0\\ 0 & -\frac{1}{2}-\frac{i\sqrt{3}}{2}\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & 1\\ \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3})\end{pmatrix}$$

$$117\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & 1 & 1\\ \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1 & \frac{1}{2}(-1+i\sqrt{3}) & \frac{1}{2}(-1-i\sqrt{3}) & 1\end{pmatrix}$$

Teorem 4.3'ün çıktıları

Grup 1

$1(1 \quad 1 \quad 1)(1 \quad 1 \quad 1)(1 \quad -1 \quad 0)$

$2(1 \quad 1 \quad -1)(1 \quad 1 \quad -1)(1 \quad -1 \quad 0)$

$4(1 \quad -1 \quad 1)(1 \quad -1 \quad 1)(1 \quad -1 \quad 0)$

$5(1 \quad -1 \quad -1)(1 \quad -1 \quad -1)(1 \quad -1 \quad 0)$

Grup 2

$$14\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$16\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$17\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 0 & \frac{1}{2} & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$27\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 0 & \frac{1}{2} & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$28\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$47\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

Grup 3

$$15\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ 2 & 1 & -2 & -1 & -1 & 1\end{pmatrix}$$

$$19\begin{pmatrix}1 & 1 & 1\\ 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ 2 & 1 & -2 & -1 & -1 & 1\end{pmatrix}$$

$$22\begin{pmatrix}1 & 1 & 1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & -2 & -1 & -1 & 1\\ -1 & 0 & 1 & 0 & 1 & -1\end{pmatrix}$$

$$26\begin{pmatrix}1 & 1 & -1\\ 1 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ -2 & -1 & 2 & 1 & 1 & -1\end{pmatrix}$$

$$31\begin{pmatrix}1 & 1 & -1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ 2 & 1 & -2 & -1 & -1 & 1\end{pmatrix}$$

$$34\begin{pmatrix}1 & 1 & -1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}2 & 1 & -2 & -1 & -1 & 1\\ -1 & 0 & 1 & 0 & 1 & -1\end{pmatrix}$$

$$48\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ 2 & 1 & -2 & -1 & -1 & 1\end{pmatrix}$$

$$49\begin{pmatrix}1 & -1 & 1\\ 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ -2 & -1 & 2 & 1 & 1 & -1\end{pmatrix}$$

$$53\begin{pmatrix}1 & -1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}2 & 1 & -2 & -1 & 1 & -1\\ 1 & 0 & -1 & 0 & 1 & -1\end{pmatrix}$$

$$56\begin{pmatrix}1 & -1 & -1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ -2 & -1 & 2 & 1 & 1 & -1\end{pmatrix}$$

$$58\begin{pmatrix}1 & -1 & -1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ -2 & -1 & 2 & 1 & 1 & -1\end{pmatrix}$$

$$60\begin{pmatrix}1 & -1 & -1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & -2 & -1 & 1 & -1\\ 1 & 0 & -1 & 0 & 1 & -1\end{pmatrix}$$

Grup 4

$$18\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2}\\ 0 & 1 & \frac{1}{2}\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$29\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & -\frac{1}{2}\\ 0 & 1 & -\frac{1}{2}\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$37\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2}\\ 0 & 1 & -\frac{1}{2}\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$38\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -\frac{1}{2}\\ 0 & 1 & \frac{1}{2}\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$

Grup 5

$20\begin{pmatrix}1 & 1 & 1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 2\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\\ 0 & 2 & 1 & -2 & 0 & -1 & -1 & 1 & 0\end{pmatrix}$

$23\begin{pmatrix}1 & 1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 2\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}0 & 2 & 1 & -2 & 0 & -1 & -1 & 1 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$

$30\begin{pmatrix}1 & 1 & -1\\ 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & -2\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\\ 0 & 2 & 1 & -2 & 0 & -1 & -1 & 1 & 0\end{pmatrix}$

$33\begin{pmatrix}1 & 1 & -1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & -2\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}0 & 2 & 1 & -2 & 0 & -1 & -1 & 1 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$

$50\begin{pmatrix}1 & -1 & 1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & -2\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\\ 0 & -2 & -1 & 2 & 0 & 1 & 1 & -1 & 0\end{pmatrix}$

$52\begin{pmatrix}1 & -1 & 1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 2\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}2 & 0 & 1 & 0 & -2 & -1 & 1 & -1 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$

$57\begin{pmatrix}1 & -1 & -1\\ 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 2\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\\ 0 & -2 & -1 & 2 & 0 & 1 & 1 & -1 & 0\end{pmatrix}$

$61\begin{pmatrix}1 & -1 & -1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -2\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}2 & 0 & 1 & 0 & -2 & -1 & 1 & -1 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$

Grup 6

$21\begin{pmatrix}1 & 1 & 1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 1 & -1 & 1 & -1\\ 0 & 2 & -2 & 0 & -1 & 1\end{pmatrix}$

$24\begin{pmatrix}1 & 1 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}0 & 2 & -2 & 0 & -1 & 1\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$

$25\begin{pmatrix}1 & 1 & 1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}0 & 2 & -2 & 0 & -1 & 1\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$

$32\begin{pmatrix}1 & 1 & -1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & -1 & 1 & -1 & 1 & -1\\ 0 & 2 & -2 & 0 & -1 & 1\end{pmatrix}$

$35\begin{pmatrix}1 & 1 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}0 & 2 & -2 & 0 & -1 & 1\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$

$36\begin{pmatrix}1 & 1 & -1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 0 & 0 & -2 & 1 & -1\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$

$51\begin{pmatrix}1 & -1 & 1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & -1 & 1 & -1 & 1 & -1\\ 0 & -2 & 2 & 0 & 1 & -1\end{pmatrix}$

$54\begin{pmatrix}1 & -1 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}2 & 0 & 0 & -2 & 1 & -1\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$

$55\begin{pmatrix}1 & -1 & 1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}0 & 2 & -2 & 0 & -1 & 1\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$

$59\begin{pmatrix}1 & -1 & -1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 1 & -1 & 1 & -1\\ 0 & -2 & 2 & 0 & 1 & -1\end{pmatrix}$

$62\begin{pmatrix}1 & -1 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}2 & 0 & 0 & -2 & 1 & -1\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$

$63\begin{pmatrix}1 & -1 & -1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 0 & 0 & -2 & 1 & -1\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$

Grup 7

$40\begin{pmatrix}1 & 1 & 0\\ 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\\ 0 & 2 & 1 & -2 & 0 & -1 & -1 & 1 & 0\end{pmatrix}$

$41\begin{pmatrix}1 & 1 & 0\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\\ 0 & 2 & 1 & -2 & 0 & -1 & -1 & 1 & 0\end{pmatrix}$

$43\begin{pmatrix}1 & 1 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}0 & 2 & 1 & -2 & 0 & -1 & -1 & 1 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$

$$44\begin{pmatrix}1 & 1 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}0 & 2 & 1 & -2 & 0 & -1 & -1 & 1 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$$

$$64\begin{pmatrix}1 & -1 & 0\\ 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\\ 0 & -2 & -1 & 2 & 0 & 1 & 1 & -1 & 0\end{pmatrix}$$

$$65\begin{pmatrix}1 & -1 & 0\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\\ 0 & -2 & -1 & 2 & 0 & 1 & 1 & -1 & 0\end{pmatrix}$$

$$67\begin{pmatrix}1 & -1 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}2 & 0 & 1 & 0 & -2 & -1 & 1 & -1 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$$

$$68\begin{pmatrix}1 & -1 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}2 & 0 & 1 & 0 & -2 & -1 & 1 & -1 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$$

Grup 8

$$46\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & -1 & -1 & 0 & 0\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$$

$$70\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & -1 & -1 & 0 & 0\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$$

$$75\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & -1 & -1 & 0 & 0\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$$

$$80\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & -1 & -1 & 0 & 0\\ 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$$

$$82\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & -1 & -1 & -1\\ 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$$

$$83\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & -1 & -1 & -1\\ 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$$

Grup 9

$$73\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & -1 & -1 & -1 & 0 & 0 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$$

$$74\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & -1 & -1 & -1 & 0 & 0 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$$

$$78\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & -1 & -1 & -1 & 0 & 0 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$$

$$79\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & -1 & -1 & -1 & 0 & 0 & 0\\ 1 & -1 & 0 & 1 & -1 & 0 & 1 & -1 & 0\end{pmatrix}$$

Grup 10

$$92\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & -1\\ 1 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & 0\\ 1 & -1\\ 0 & 0\end{pmatrix}$$

$$102\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & -1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & 0\\ 1 & -1\\ 0 & 0\end{pmatrix}$$

$$115\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & 1\\ 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 0\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & 0\\ 1 & -1\\ 0 & 0\end{pmatrix}$$

$$120\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 0\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & 0\\ 1 & -1\\ 0 & 0\end{pmatrix}$$

$$125\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & -1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & -1\\ 0 & 0\\ 0 & 0\end{pmatrix}$$

$$126\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & -1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & -1\\ 0 & 0\\ 0 & 0\end{pmatrix}$$

$$172\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & 1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & -1\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & -1\\ 0 & 0\\ 0 & 0\end{pmatrix}$$

$$174\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & -1\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & -1\\ 0 & 0\\ 0 & 0\end{pmatrix}$$

$$179\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & -1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 0\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & 0\\ 1 & -1\\ 0 & 0\end{pmatrix}$$

$$183\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 0\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & 0\\ 1 & -1\\ 0 & 0\end{pmatrix}$$

$$258\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & -1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & 0\\ 1 & -1\\ 0 & 0\end{pmatrix}$$

$$265\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & -1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & 0\\ 1 & -1\\ 0 & 0\end{pmatrix}$$

Grup 11

$$93\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & -1\\ 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & -\frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & 1 & -1\\ 1 & \frac{1}{2} & 1 & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$94\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & -1\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & 1 & -1\\ 1 & 1 & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$113\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & 1\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & 1 & -1\end{pmatrix}$$

$$168\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & 1\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & 1 & -1 & -\frac{1}{2} & -1 & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & 1 & -1\end{pmatrix}$$

Grup 12

$$95\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & -1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & -\frac{1}{2} & \frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & \frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4}\\ -\frac{1}{2} & \frac{1}{2} & -\frac{1}{4} & \frac{3}{4} & \frac{1}{4} & -\frac{1}{2} & \frac{1}{2} & -\frac{3}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{3}{4} & \frac{1}{4} & -\frac{3}{4} & \frac{1}{4} & -\frac{1}{4}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$116\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & 1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & -\frac{1}{2} & \frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & \frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ -\frac{1}{2} & \frac{1}{2} & -\frac{1}{4} & \frac{3}{4} & \frac{1}{4} & -\frac{1}{2} & \frac{1}{2} & -\frac{3}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{3}{4} & \frac{1}{4} & -\frac{3}{4} & \frac{1}{4} & -\frac{1}{4}\end{pmatrix}$$

$$127\begin{pmatrix}1&1&1\\1&-1&-1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\ \frac{1}{2}&-\frac{1}{2}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}\\ -\frac{1}{2}&\frac{1}{2}&-\frac{1}{4}&\frac{3}{4}&\frac{1}{4}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{4}&\frac{1}{4}&-\frac{1}{4}&-\frac{3}{4}&\frac{1}{4}&-\frac{1}{4}&-\frac{1}{4}&\frac{3}{4}&\frac{1}{4}\end{pmatrix}$$

$$173\begin{pmatrix}1&1&-1\\1&-1&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\ \frac{1}{2}&-\frac{1}{2}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}\\ \frac{1}{2}&-\frac{1}{2}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}\end{pmatrix}$$

$$178\begin{pmatrix}1&1&-1\\1&-1&-1\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&-\frac{1}{2}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}\\ 1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\ \frac{1}{2}&-\frac{1}{2}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}\end{pmatrix}$$

$$213\begin{pmatrix}1&1&0\\1&-1&1\\1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{3}{4}&\frac{1}{2}&\frac{1}{4}&\frac{3}{4}&\frac{1}{4}&-\frac{1}{2}&-\frac{1}{4}&-\frac{1}{2}&-\frac{3}{4}&-\frac{1}{4}&-\frac{3}{4}&\frac{1}{4}&-\frac{1}{4}&\frac{1}{4}&-\frac{1}{4}\\ \frac{1}{2}&\frac{1}{4}&\frac{1}{2}&\frac{3}{4}&\frac{1}{4}&\frac{3}{4}&-\frac{1}{2}&-\frac{3}{4}&-\frac{1}{2}&-\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&-\frac{1}{4}&\frac{1}{4}&-\frac{1}{4}&\frac{1}{4}\\ 1&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

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$$96\begin{pmatrix}1&1&1\\1&1&-1\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-1&-\frac{3}{2}&-\frac{1}{2}&2&1&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}\\ 2&1&2&1&-2&-1&-2&-1&-1&1&-1&1\\ 1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$97\begin{pmatrix}1&1&1\\1&1&-1\\1&0&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&\frac{3}{2}&-\frac{1}{2}&-2&-1&\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}\\ -2&-1&-1&1&2&1&-1&1&2&1&-2&-1\\ 1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$99\begin{pmatrix}1&1&1\\1&1&-1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&2&1&-2&-1&-2&-1&-1&1&-1&1\\ -2&-1&-\frac{3}{2}&-\frac{1}{2}&2&1&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}\\ 1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$100\begin{pmatrix}1&1&1\\1&1&-1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-1&-1&1&2&1&-1&1&2&1&-2&-1\\ 2&1&\frac{3}{2}&-\frac{1}{2}&-2&-1&\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}\\ 1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$103\begin{pmatrix}1&1&1\\1&1&0\\1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-\frac{3}{2}&-1&-\frac{1}{2}&2&\frac{3}{2}&1&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}\\ 1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\ 2&2&1&1&-2&-2&-1&-1&-1&-1&1&1\end{pmatrix}$$

$$104\begin{pmatrix}1&1&1\\1&1&0\\1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\ -2&-\frac{3}{2}&-1&-\frac{1}{2}&2&\frac{3}{2}&1&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}\\ 2&2&1&1&-2&-2&-1&-1&-1&-1&1&1\end{pmatrix}$$

$$114\begin{pmatrix}1&1&1\\1&-1&1\\1&-1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&\frac{3}{2}&-\frac{1}{2}&-2&-1&\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-2&-1&-1&1&2&1&-1&1&2&1&-2&-1\end{pmatrix}$$

$$118\begin{pmatrix}1&1&1\\1&-1&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&2&1&-2&-1&-2&-1&-1&1&-1&1\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-2&-1&-\frac{3}{2}&-\frac{1}{2}&2&1&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}\end{pmatrix}$$

$$119\begin{pmatrix}1&1&1\\1&-1&1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-1&1&-1&2&1&1&-1&2&1&-2&-1\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\2&1&-\frac{1}{2}&\frac{3}{2}&-2&-1&-\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}\end{pmatrix}$$

$$122\begin{pmatrix}1&1&1\\1&-1&-1\\1&-1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\2&1&-\frac{1}{2}&\frac{3}{2}&-2&-1&-\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}\\-2&-1&1&-1&2&1&1&-1&-2&-1&2&1\end{pmatrix}$$

$$123\begin{pmatrix}1&1&1\\1&-1&-1\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\2&1&2&1&-2&-1&-2&-1&-1&1&-1&1\\-2&-1&-\frac{3}{2}&-\frac{1}{2}&2&1&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&\frac{3}{2}&-\frac{1}{2}\end{pmatrix}$$

$$124\begin{pmatrix}1&1&1\\1&-1&-1\\1&0&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\-2&-1&1&-1&2&1&1&-1&-2&-1&2&1\\2&1&-\frac{1}{2}&\frac{3}{2}&-2&-1&-\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}\end{pmatrix}$$

$$158\begin{pmatrix}1&1&-1\\1&1&0\\1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-2&-\frac{3}{2}&-1&-\frac{1}{2}&2&\frac{3}{2}&1&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}\\-2&-2&-1&-1&2&2&1&1&1&1&-1&-1\end{pmatrix}$$

$$159\begin{pmatrix}1&1&-1\\1&1&0\\1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-\frac{3}{2}&-1&-\frac{1}{2}&2&\frac{3}{2}&1&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}\\1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\-2&-2&-1&-1&2&2&1&1&1&1&-1&-1\end{pmatrix}$$

$$169\begin{pmatrix}1&1&-1\\1&-1&1\\1&-1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\2&1&-\frac{1}{2}&\frac{3}{2}&-2&-1&-\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}\\2&1&-1&1&-2&-1&-1&1&2&1&-2&-1\end{pmatrix}$$

$$170\begin{pmatrix}1&1&-1\\1&-1&1\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\-2&-1&1&-1&2&1&1&-1&-2&-1&2&1\\-2&-1&\frac{1}{2}&-\frac{3}{2}&2&1&\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}\end{pmatrix}$$

$$171\begin{pmatrix}1&1&-1\\1&-1&1\\1&0&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\2&1&2&1&-2&-1&-2&-1&-1&1&-1&1\\2&1&\frac{3}{2}&\frac{1}{2}&-2&-1&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&-\frac{3}{2}&\frac{1}{2}\end{pmatrix}$$

$$177\begin{pmatrix}1&1&-1\\1&-1&-1\\1&-1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&\frac{3}{2}&-\frac{1}{2}&-2&-1&\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\2&1&1&-1&-2&-1&1&-1&-2&-1&2&1\end{pmatrix}$$

$$181\begin{pmatrix}1&1&-1\\1&-1&-1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-1&1&-1&2&1&1&-1&2&1&-2&-1\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-2&-1&\frac{1}{2}&-\frac{3}{2}&2&1&\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}\end{pmatrix}$$

$$182\begin{pmatrix}1&1&-1\\1&-1&-1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&2&1&-2&-1&-2&-1&-1&1&-1&1\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\2&1&\frac{3}{2}&\frac{1}{2}&-2&-1&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}\end{pmatrix}$$

$$259\begin{pmatrix}1&-1&1\\1&-1&-1\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-1&-\frac{3}{2}&-\frac{1}{2}&2&1&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}\\-2&-1&-2&-1&2&1&2&1&1&-1&1&-1\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$260\begin{pmatrix}1&-1&1\\1&-1&-1\\1&0&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&\frac{3}{2}&-\frac{1}{2}&-2&-1&\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}\\2&1&1&-1&-2&-1&1&-1&-2&-1&2&1\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$262\begin{pmatrix}1&-1&1\\1&-1&-1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-1&1&-1&2&1&1&-1&2&1&-2&-1\\-2&-1&\frac{1}{2}&-\frac{3}{2}&2&1&\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$263\begin{pmatrix}1&-1&1\\1&-1&-1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&2&1&-2&-1&-2&-1&1&-1&1&-1\\2&1&\frac{3}{2}&\frac{1}{2}&-2&-1&-\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&\frac{3}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

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$$98\begin{pmatrix}1&1&1\\1&1&-1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\\-1&1&-\frac{1}{2}&\frac{3}{2}&-1&1&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&-\frac{3}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$101\begin{pmatrix}1&1&1\\1&1&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&1&-\frac{1}{2}&\frac{3}{2}&-1&1&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&-\frac{3}{2}&\frac{1}{2}\\1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$117\begin{pmatrix}1&1&1\\1&-1&1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-1&1&-\frac{1}{2}&\frac{3}{2}&-1&1&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&-\frac{3}{2}&\frac{1}{2}\end{pmatrix}$$

$$121\begin{pmatrix}1&1&1\\1&-1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&1&-\frac{1}{2}&\frac{3}{2}&-1&1&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&-\frac{3}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$128\begin{pmatrix}1&1&1\\1&-1&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\\-1&1&-\frac{1}{2}&\frac{3}{2}&-1&1&-\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}\end{pmatrix}$$

$$129\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & -1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ -1 & 1 & -\frac{1}{2} & \frac{3}{2} & -1 & 1 & -\frac{3}{2} & \frac{1}{2} & -\frac{3}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{3}{2}\\ 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$$

$$175\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1\\ 1 & -1 & \frac{1}{2} & -\frac{3}{2} & 1 & -1 & \frac{3}{2} & -\frac{1}{2} & \frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{3}{2}\end{pmatrix}$$

$$176\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & 1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ 1 & -1 & \frac{3}{2} & -\frac{1}{2} & 1 & -1 & \frac{1}{2} & -\frac{3}{2} & \frac{1}{2} & -\frac{3}{2} & \frac{3}{2} & -\frac{1}{2}\\ 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$$

$$180\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & -1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ 1 & -1 & \frac{1}{2} & -\frac{3}{2} & 1 & -1 & \frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{3}{2} & \frac{3}{2} & -\frac{1}{2}\end{pmatrix}$$

$$184\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & -1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & \frac{3}{2} & -\frac{1}{2} & 1 & -1 & \frac{1}{2} & -\frac{3}{2} & \frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{3}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$$

$$261\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & -1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1\\ 1 & -1 & \frac{1}{2} & -\frac{3}{2} & 1 & -1 & \frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{3}{2} & \frac{3}{2} & -\frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$264\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & \frac{3}{2} & -\frac{1}{2} & 1 & -1 & \frac{1}{2} & -\frac{3}{2} & \frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{3}{2}\\ 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

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$$105\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & 0\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 2 & 1 & 1 & -2 & -1 & -1 & -1 & 1\end{pmatrix}$$

$$137\begin{pmatrix}1 & 1 & 1\\ 1 & 0 & 1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 2 & 1 & 1 & -2 & -1 & -1 & -1 & 1\\ -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\end{pmatrix}$$

$$152\begin{pmatrix}1 & 1 & 1\\ 0 & 1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & 1 & -2 & -1 & -1 & -1 & 1\\ -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\end{pmatrix}$$

$$160\begin{pmatrix}1 & 1 & -1\\ 1 & 1 & 0\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -2 & -1 & -1 & 2 & 1 & 1 & 1 & -1\end{pmatrix}$$

$$192\begin{pmatrix}1 & 1 & -1\\ 1 & 0 & 1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & 1 & 2 & -1 & -1 & -2 & -1 & 1\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$207\begin{pmatrix}1 & 1 & -1\\ 0 & 1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 2 & -1 & -1 & -2 & -1 & 1\\ \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$214\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & 1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & -1 & 1 & -1 & 2 & -2 & -1 & 1\end{pmatrix}$$

$$222\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & -1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ -1 & 1 & -1 & 1 & -2 & 2 & 1 & -1\end{pmatrix}$$

$$273\begin{pmatrix}1 & -1 & 1\\ 1 & 0 & 1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -2 & -1 & -1 & 2 & 1 & 1 & 1 & -1\\ -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\end{pmatrix}$$

$$288\begin{pmatrix}1 & -1 & 1\\ 0 & 1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 2 & -1 & -1 & -2 & 1 & -1\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$301\begin{pmatrix}1 & -1 & -1\\ 1 & 0 & 1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -1 & -1 & -2 & 1 & 1 & 2 & 1 & -1\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$316\begin{pmatrix}1 & -1 & -1\\ 0 & 1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & 1 & -2 & -1 & -1 & 1 & -1\\ \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\end{pmatrix}$$

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$$106\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & 0\\ 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-3 & -2 & -2 & -1 & 3 & 2 & 2 & 1 & 2 & -2\\ 2 & 1 & 2 & 1 & -2 & -1 & -2 & -1 & -1 & 1\\ 2 & 2 & 1 & 1 & -2 & -2 & -1 & -1 & -1 & 1\end{pmatrix}$$

$$109\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & 2 & 1 & -2 & -1 & -2 & -1 & -1 & 1\\ -3 & -2 & -2 & -1 & 3 & 2 & 2 & 1 & 2 & -2\\ 2 & 2 & 1 & 1 & -2 & -2 & -1 & -1 & -1 & 1\end{pmatrix}$$

$$139\begin{pmatrix}1 & 1 & 1\\ 1 & 0 & 1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & 2 & 1 & -2 & -1 & -2 & -1 & -1 & 1\\ 2 & 2 & 1 & 1 & -2 & -2 & -1 & -1 & -1 & 1\\ -3 & -2 & -2 & -1 & 3 & 2 & 2 & 1 & 2 & -2\end{pmatrix}$$

$$162\begin{pmatrix}1 & 1 & -1\\ 1 & 1 & 0\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-3 & -2 & -2 & -1 & 3 & 2 & 2 & 1 & 2 & -2\\ 2 & 1 & 2 & 1 & -2 & -1 & -2 & -1 & -1 & 1\\ -2 & -2 & -1 & -1 & 2 & 2 & 1 & 1 & 1 & -1\end{pmatrix}$$

$$165\begin{pmatrix}1 & 1 & -1\\ 1 & 1 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & 2 & 1 & -2 & -1 & -2 & -1 & -1 & 1\\ -3 & -2 & -2 & -1 & 3 & 2 & 2 & 1 & 2 & -2\\ -2 & -2 & -1 & -1 & 2 & 2 & 1 & 1 & 1 & -1\end{pmatrix}$$

$$200\begin{pmatrix}1 & 1 & -1\\ 1 & 0 & -1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & 2 & 1 & -2 & -1 & -2 & -1 & -1 & 1\\ 2 & 2 & 1 & 1 & -2 & -2 & -1 & -1 & -1 & 1\\ 3 & 2 & 2 & 1 & -3 & -2 & -2 & -1 & -2 & 2\end{pmatrix}$$

$$266\begin{pmatrix}1&-1&1\\1&-1&0\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-3&-2&-2&-1&3&2&2&1&2&-2\\-2&-1&-2&-1&2&1&2&1&1&-1\\2&2&1&1&-2&-2&-1&-1&-1&1\end{pmatrix}$$

$$270\begin{pmatrix}1&-1&1\\1&-1&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&2&1&-2&-1&-2&-1&-1&1\\3&2&2&1&-3&-2&-2&-1&-2&2\\2&2&1&1&-2&-2&-1&-1&-1&1\end{pmatrix}$$

$$276\begin{pmatrix}1&-1&1\\1&0&1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&2&1&-2&-1&-2&-1&-1&1\\-2&-2&-1&-1&2&2&1&1&1&-1\\-3&-2&-2&-1&3&2&2&1&2&-2\end{pmatrix}$$

$$295\begin{pmatrix}1&-1&-1\\1&-1&0\\1&0&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-3&-2&-2&-1&3&2&2&1&2&-2\\-2&-1&-2&-1&2&1&2&1&1&-1\\-2&-2&-1&-1&2&2&1&1&1&-1\end{pmatrix}$$

$$297\begin{pmatrix}1&-1&-1\\1&-1&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&2&1&-2&-1&-2&-1&-1&1\\3&2&2&1&-3&-2&-2&-1&-2&2\\-2&-2&-1&-1&2&2&1&1&1&-1\end{pmatrix}$$

$$308\begin{pmatrix}1&-1&-1\\1&0&-1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&2&1&-2&-1&-2&-1&-1&1\\-2&-2&-1&-1&2&2&1&1&1&-1\\3&2&2&1&-3&-2&-2&-1&-2&2\end{pmatrix}$$

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$$107\begin{pmatrix}1&1&1\\1&1&0\\1&0&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}3&1&2&2&1&-1&-3&-2&-2&-1&-2&-1&2&1\\-4&-2&-3&-2&-1&2&4&3&2&1&3&2&-3&-2\\2&2&2&1&1&-2&-2&-2&-1&-1&-1&-1&1&1\end{pmatrix}$$

$$110\begin{pmatrix}1&1&1\\1&1&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-4&-2&-3&-2&-1&2&4&3&2&1&3&2&-3&-2\\3&1&2&2&1&-1&-3&-2&-2&-1&-2&-1&2&1\\2&2&2&1&1&-2&-2&-2&-1&-1&-1&-1&1&1\end{pmatrix}$$

$$130\begin{pmatrix}1&1&1\\1&-1&0\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}3&2&1&2&1&-1&-3&-2&-2&-1&2&-2&-1&1\\2&1&2&2&1&-2&-2&-1&-2&-1&1&-1&-1&1\\-4&-2&-2&-3&-1&2&4&2&3&1&-3&3&2&-2\end{pmatrix}$$

$$133\begin{pmatrix}1&1&1\\1&-1&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&1&2&1&-2&-1&-2&-2&-1&-1&1&-1&1\\1&3&2&2&1&-3&-2&-1&-2&-1&-2&2&-1&1\\-2&-4&-2&-3&-1&4&2&2&3&1&3&-3&2&-2\end{pmatrix}$$

$$140\begin{pmatrix}1&1&1\\1&0&1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-4&-3&-2&-1&4&2&3&2&1&3&2&-3&-2\\2&2&2&1&1&-2&-2&-2&-1&-1&-1&-1&1&1\\1&3&2&2&1&-3&-1&-2&-2&-1&-2&-1&2&1\end{pmatrix}$$

$$144\begin{pmatrix}1&1&1\\1&0&-1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&1&2&1&-2&-1&-2&-2&-1&-1&1&-1&1\\-2&-4&-2&-3&-1&4&2&2&3&1&3&-3&2&-2\\1&3&2&2&1&-3&-2&-1&-2&-1&-2&2&-1&1\end{pmatrix}$$

$$161\begin{pmatrix}1&1&-1\\1&1&0\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}3&1&2&2&1&-1&-3&-2&-2&-1&-2&-1&2&1\\-4&-2&-3&-2&-1&2&4&3&2&1&3&2&-3&-2\\-2&-2&-2&-1&-1&2&2&2&1&1&1&1&-1&-1\end{pmatrix}$$

$$164\begin{pmatrix}1&1&-1\\1&1&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-4&-2&-3&-2&-1&2&4&3&2&1&3&2&-3&-2\\3&1&2&2&1&-1&-3&-2&-2&-1&-2&-1&2&1\\-2&-2&-2&-1&-1&2&2&2&1&1&1&1&-1&-1\end{pmatrix}$$

$$186\begin{pmatrix}1&1&-1\\1&-1&0\\1&0&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}3&2&1&2&1&-1&-3&-2&-2&-1&2&-2&-1&1\\2&1&2&2&1&-2&-2&-1&-2&-1&1&-1&-1&1\\4&2&2&3&1&-2&-4&-2&-3&-1&3&-3&-2&2\end{pmatrix}$$

$$189\begin{pmatrix}1&1&-1\\1&-1&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&1&2&1&-2&-1&-2&-2&-1&-1&1&-1&1\\1&3&2&2&1&-3&-2&-1&-2&-1&-2&2&-1&1\\2&4&2&3&1&-4&-2&-2&-3&-1&-3&3&-2&2\end{pmatrix}$$

$$195\begin{pmatrix}1&1&-1\\1&0&1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&1&2&1&-2&-1&-2&-2&-1&-1&1&-1&1\\-2&-4&-2&-3&-1&4&2&2&3&1&3&-3&2&-2\\-1&-3&-2&-2&-1&3&2&1&2&1&2&-2&1&-1\end{pmatrix}$$

$$199\begin{pmatrix}1&1&-1\\1&0&-1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-4&-3&-2&-1&4&2&3&2&1&3&2&-3&-2\\2&2&2&1&1&-2&-2&-2&-1&-1&-1&-1&1&1\\-1&-3&-2&-2&-1&3&1&2&2&1&2&1&-2&-1\end{pmatrix}$$

$$215\begin{pmatrix}1&1&0\\1&-1&1\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}3&2&-1&2&1&-3&-2&-2&2&1&-2&-1&-1&1\\-2&-1&2&-1&-2&2&1&1&-2&-1&2&1&1&-1\\-4&-2&2&-3&-2&4&2&3&-3&-1&3&1&2&-2\end{pmatrix}$$

$$219\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & -2 & -1 & -1 & 2 & 1 & -2 & 1 & 2 & 1 & -2 & -1 & 1 & -1\\ -1 & 3 & 2 & 2 & -3 & -2 & 1 & -2 & -2 & -1 & 2 & 1 & -1 & 1\\ -2 & 4 & 2 & 3 & -4 & -2 & 2 & -3 & -3 & -1 & 3 & 1 & -2 & 2\end{pmatrix}$$

$$224\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & -1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}3 & 2 & -1 & 2 & 1 & -3 & -2 & -2 & 2 & 1 & -2 & -1 & -1 & 1\\ -2 & -1 & 2 & -1 & -2 & 2 & 1 & 1 & -2 & -1 & 2 & 1 & 1 & -1\\ 4 & 2 & -2 & 3 & 2 & -4 & -2 & -3 & 3 & 1 & -3 & -1 & -2 & 2\end{pmatrix}$$

$$226\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & -1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & -2 & -1 & -1 & 2 & 1 & -2 & 1 & 2 & 1 & -2 & -1 & 1 & -1\\ -1 & 3 & 2 & 2 & -3 & -2 & 1 & -2 & -2 & -1 & 2 & 1 & -1 & 1\\ 2 & -4 & -2 & -3 & 4 & 2 & -2 & 3 & 3 & 1 & -3 & -1 & 2 & -2\end{pmatrix}$$

$$267\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & 0\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}3 & 1 & 2 & 2 & 1 & -1 & -3 & -2 & -2 & -1 & -2 & -1 & 2 & 1\\ 4 & 2 & 3 & 2 & 1 & -2 & -4 & -3 & -2 & -1 & -3 & -2 & 3 & 2\\ 2 & 2 & 2 & 1 & 1 & -2 & -2 & -2 & -1 & -1 & -1 & -1 & 1 & 1\end{pmatrix}$$

$$269\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-2 & -4 & -3 & -2 & -1 & 4 & 2 & 3 & 2 & 1 & 3 & 2 & -3 & -2\\ -1 & -3 & -2 & -2 & -1 & 3 & 1 & 2 & 2 & 1 & 2 & 1 & -2 & -1\\ 2 & 2 & 2 & 1 & 1 & -2 & -2 & -2 & -1 & -1 & -1 & -1 & 1 & 1\end{pmatrix}$$

$$275\begin{pmatrix}1 & -1 & 1\\ 1 & 0 & 1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-4 & -2 & -3 & -2 & -1 & 2 & 4 & 3 & 2 & 1 & 3 & 2 & -3 & -2\\ -2 & -2 & -2 & -1 & -1 & 2 & 2 & 2 & 1 & 1 & 1 & 1 & -1 & -1\\ 3 & 1 & 2 & 2 & 1 & -1 & -3 & -2 & -2 & -1 & -2 & -1 & 2 & 1\end{pmatrix}$$

$$281\begin{pmatrix}1 & -1 & 1\\ 1 & 0 & -1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 2 & 1 & 2 & 1 & -2 & -1 & -2 & -2 & -1 & -1 & 1 & 1 & -1\\ 2 & 4 & 2 & 3 & 1 & -4 & -2 & -2 & -3 & -1 & -3 & 3 & 2 & -2\\ 1 & 3 & 2 & 2 & 1 & -3 & -2 & -1 & -2 & -1 & -2 & 2 & 1 & -1\end{pmatrix}$$

$$294\begin{pmatrix}1 & -1 & -1\\ 1 & -1 & 0\\ 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}3 & 1 & 2 & 2 & 1 & -1 & -3 & -2 & -2 & -1 & -2 & -1 & 2 & 1\\ 4 & 2 & 3 & 2 & 1 & -2 & -4 & -3 & -2 & -1 & -3 & -2 & 3 & 2\\ -2 & -2 & -2 & -1 & -1 & 2 & 2 & 2 & 1 & 1 & 1 & 1 & -1 & -1\end{pmatrix}$$

$$298\begin{pmatrix}1 & -1 & -1\\ 1 & -1 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-2 & -4 & -3 & -2 & -1 & 4 & 2 & 3 & 2 & 1 & 3 & 2 & -3 & -2\\ -1 & -3 & -2 & -2 & -1 & 3 & 1 & 2 & 2 & 1 & 2 & 1 & -2 & -1\\ -2 & -2 & -2 & -1 & -1 & 2 & 2 & 2 & 1 & 1 & 1 & 1 & -1 & -1\end{pmatrix}$$

$$303\begin{pmatrix}1 & -1 & -1\\ 1 & 0 & 1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 2 & 1 & 2 & 1 & -2 & -1 & -2 & -2 & -1 & -1 & 1 & 1 & -1\\ 2 & 4 & 2 & 3 & 1 & -4 & -2 & -2 & -3 & -1 & -3 & 3 & 2 & -2\\ -1 & -3 & -2 & -2 & -1 & 3 & 2 & 1 & 2 & 1 & 2 & -2 & -1 & 1\end{pmatrix}$$

$$309\begin{pmatrix}1 & -1 & -1\\ 1 & 0 & -1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-4 & -2 & -3 & -2 & -1 & 2 & 4 & 3 & 2 & 1 & 3 & 2 & -3 & -2\\ -2 & -2 & -2 & -1 & -1 & 2 & 2 & 2 & 1 & 1 & 1 & 1 & -1 & -1\\ -3 & -1 & -2 & -2 & -1 & 1 & 3 & 2 & 2 & 1 & 2 & 1 & -2 & -1\end{pmatrix}$$

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$$108\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & 0\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & -1 & -1 & 1 & -1 & -1 & 1\\ -2 & -1 & 1 & 2 & -1 & 1 & 2 & -2\\ 2 & 1 & 1 & -2 & -1 & -1 & -1 & 1\end{pmatrix}$$

$$111\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & 0\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-2 & -1 & 1 & 2 & -1 & 1 & 2 & -2\\ 1 & 1 & -1 & -1 & 1 & -1 & -1 & 1\\ 2 & 1 & 1 & -2 & -1 & -1 & -1 & 1\end{pmatrix}$$

$$138\begin{pmatrix}1 & 1 & 1\\ 1 & 0 & 1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & -1 & -1 & 1 & -1 & -1 & 1\\ 2 & 1 & 1 & -2 & -1 & -1 & -1 & 1\\ -2 & -1 & 1 & 2 & -1 & 1 & 2 & -2\end{pmatrix}$$

$$142\begin{pmatrix}1 & 1 & 1\\ 1 & 0 & 1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-2 & -1 & 1 & 2 & -1 & 1 & 2 & -2\\ 2 & 1 & 1 & -2 & -1 & -1 & -1 & 1\\ 1 & 1 & -1 & -1 & 1 & -1 & -1 & 1\end{pmatrix}$$

$$153\begin{pmatrix}1 & 1 & 1\\ 0 & 1 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & 1 & -2 & -1 & -1 & -1 & 1\\ 1 & 1 & -1 & -1 & 1 & -1 & -1 & 1\\ -2 & -1 & 1 & 2 & -1 & 1 & 2 & -2\end{pmatrix}$$

$$154\begin{pmatrix}1 & 1 & 1\\ 0 & 1 & 1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & 1 & -2 & -1 & -1 & -1 & 1\\ -2 & -1 & 1 & 2 & -1 & 1 & 2 & -2\\ 1 & 1 & -1 & -1 & 1 & -1 & -1 & 1\end{pmatrix}$$

$$163\begin{pmatrix}1 & 1 & -1\\ 1 & 1 & 0\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & -1 & -1 & 1 & -1 & -1 & 1\\ -2 & -1 & 1 & 2 & -1 & 1 & 2 & -2\\ -2 & -1 & -1 & 2 & 1 & 1 & 1 & -1\end{pmatrix}$$

$$166\begin{pmatrix}1 & 1 & -1\\ 1 & 1 & 0\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-2 & -1 & 1 & 2 & -1 & 1 & 2 & -2\\ 1 & 1 & -1 & -1 & 1 & -1 & -1 & 1\\ -2 & -1 & -1 & 2 & 1 & 1 & 1 & -1\end{pmatrix}$$

$$198\begin{pmatrix}1&1&-1\\1&0&-1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&-1&-1&1\\2&1&1&-2&-1&-1&-1&1\\2&1&-1&-2&1&-1&-2&2\end{pmatrix}$$

$$202\begin{pmatrix}1&1&-1\\1&0&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&1&-1&2&1&-1&2&-2\\2&1&1&-2&-1&-1&-1&1\\-1&1&-1&1&1&-1&1&-1\end{pmatrix}$$

$$210\begin{pmatrix}1&1&-1\\0&1&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&1&-2&-1&-1&-1&1\\1&1&-1&-1&1&-1&-1&1\\2&1&-1&-2&1&-1&-2&2\end{pmatrix}$$

$$211\begin{pmatrix}1&1&-1\\0&1&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&1&-2&-1&-1&-1&1\\-2&1&-1&2&1&-1&2&-2\\-1&1&-1&1&1&-1&1&-1\end{pmatrix}$$

$$268\begin{pmatrix}1&-1&1\\1&-1&0\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&-1&-1&1\\2&1&-1&-2&1&-1&-2&2\\2&1&1&-2&-1&-1&-1&1\end{pmatrix}$$

$$271\begin{pmatrix}1&-1&1\\1&-1&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&1&-1&2&1&-1&2&-2\\-1&1&-1&1&1&-1&1&-1\\2&1&1&-2&-1&-1&-1&1\end{pmatrix}$$

$$274\begin{pmatrix}1&-1&1\\1&0&1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&-1&-1&1\\-2&-1&-1&2&1&1&1&-1\\-2&-1&1&2&-1&1&2&-2\end{pmatrix}$$

$$278\begin{pmatrix}1&-1&1\\1&0&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-1&1&2&-1&1&2&-2\\-2&-1&-1&2&1&1&1&-1\\1&1&-1&-1&1&-1&-1&1\end{pmatrix}$$

$$291\begin{pmatrix}1&-1&1\\0&1&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&1&-2&-1&-1&1&-1\\-1&1&-1&1&1&-1&-1&1\\-2&1&-1&2&1&-1&-2&2\end{pmatrix}$$

$$292\begin{pmatrix}1&-1&1\\0&1&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&1&-2&-1&-1&1&-1\\2&1&-1&-2&1&-1&2&-2\\1&1&-1&-1&1&-1&1&-1\end{pmatrix}$$

$$296\begin{pmatrix}1&-1&-1\\1&-1&0\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&-1&-1&1\\2&1&-1&-2&1&-1&-2&2\\-2&-1&-1&2&1&1&1&-1\end{pmatrix}$$

$$299\begin{pmatrix}1&-1&-1\\1&-1&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&1&-1&2&1&-1&2&-2\\-1&1&-1&1&1&-1&1&-1\\-2&-1&-1&2&1&1&1&-1\end{pmatrix}$$

$$307\begin{pmatrix}1&-1&-1\\1&0&-1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&-1&-1&1\\-2&-1&-1&2&1&1&1&-1\\2&1&-1&-2&1&-1&-2&2\end{pmatrix}$$

$$311\begin{pmatrix}1&-1&-1\\1&0&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&1&-1&2&1&-1&2&-2\\-2&-1&-1&2&1&1&1&-1\\-1&1&-1&1&1&-1&1&-1\end{pmatrix}$$

$$317\begin{pmatrix}1&-1&-1\\0&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&1&-2&-1&-1&1&-1\\-1&1&-1&1&1&-1&-1&1\\2&-1&1&-2&-1&1&2&-2\end{pmatrix}$$

$$318\begin{pmatrix}1&-1&-1\\0&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&1&-2&-1&-1&1&-1\\2&-1&1&-2&-1&1&2&-2\\-1&1&-1&1&1&-1&-1&1\end{pmatrix}$$

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$$112\begin{pmatrix}1&1&1\\1&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&0\\0&0&1\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&1&-1\\1&-1&-1&1\\0&0&0&0\end{pmatrix}$$

$$141\begin{pmatrix}1&1&1\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&1&-1\\1&-1&-1&1\\0&0&0&0\end{pmatrix}$$

$$148\begin{pmatrix}1&1&1\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&1\\0&0&0\end{pmatrix}\begin{pmatrix}1&-1&1&-1\\0&0&-1&1\\0&0&0&0\end{pmatrix}$$

$$167\begin{pmatrix}1&1&-1\\1&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&0\\0&0&1\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&1&-1\\-1&1&1&-1\\0&0&0&0\end{pmatrix}$$

$$201\begin{pmatrix}1&1&-1\\1&0&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&-1\\0&1&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&1&-1\\1&-1&-1&1\\0&0&0&0\end{pmatrix}$$

$$204\begin{pmatrix}1&1&-1\\1&0&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&-1\\0&0&0\end{pmatrix}\begin{pmatrix}1&-1&1&-1\\0&0&-1&1\\0&0&0&0\end{pmatrix}$$

$$272\begin{pmatrix}1&-1&1\\1&-1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&-1&0\\0&0&1\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&1&-1\\1&-1&-1&1\\0&0&0&0\end{pmatrix}$$

$$277\begin{pmatrix}1&-1&1\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&1&-1\\-1&1&1&-1\\0&0&0&0\end{pmatrix}$$

$$285\begin{pmatrix}1&-1&1\\1&0&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&-1\\0&0&0\end{pmatrix}\begin{pmatrix}1&-1&1&-1\\0&0&1&-1\\0&0&0&0\end{pmatrix}$$

$$300\begin{pmatrix}1&-1&-1\\1&-1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&-1&0\\0&0&1\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&1&-1\\-1&1&1&-1\\0&0&0&0\end{pmatrix}$$

$$310\begin{pmatrix}1&-1&-1\\1&0&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&-1\\0&1&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&1&-1\\-1&1&1&-1\\0&0&0&0\end{pmatrix}$$

$$312\begin{pmatrix}1&-1&-1\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&1\\0&0&0\end{pmatrix}\begin{pmatrix}1&-1&1&-1\\0&0&1&-1\\0&0&0&0\end{pmatrix}$$

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$$131\begin{pmatrix}1&1&1\\1&-1&0\\1&0&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}\\-\frac{2}{3}&-\frac{1}{3}&\frac{4}{3}&\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{4}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}\\\frac{4}{3}&\frac{2}{3}&-\frac{2}{3}&\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{2}{3}&\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{2}{3}\end{pmatrix}$$

$$134\begin{pmatrix}1&1&1\\1&-1&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{4}{3}&\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}\\\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}\\-\frac{2}{3}&\frac{2}{3}&\frac{4}{3}&\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{2}{3}&\frac{2}{3}\end{pmatrix}$$

$$145\begin{pmatrix}1&1&1\\1&0&-1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{2}{3}&\frac{4}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}\\\frac{2}{3}&-\frac{2}{3}&\frac{4}{3}&\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{4}{3}&-\frac{2}{3}&\frac{2}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}\\-\frac{1}{3}&\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}\end{pmatrix}$$

$$185\begin{pmatrix}1&1&-1\\1&-1&0\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}\\-\frac{2}{3}&-\frac{1}{3}&\frac{4}{3}&\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{4}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}\\-\frac{4}{3}&-\frac{2}{3}&\frac{2}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}&\frac{4}{3}&\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}\end{pmatrix}$$

$$188\begin{pmatrix}1&1&-1\\1&-1&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{4}{3}&\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}\\\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}\\\frac{2}{3}&-\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{4}{3}&\frac{2}{3}&\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}\end{pmatrix}$$

$$194\begin{pmatrix}1&1&-1\\1&0&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{2}{3}&\frac{4}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}\\\frac{2}{3}&-\frac{2}{3}&\frac{4}{3}&\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{4}{3}&-\frac{2}{3}&\frac{2}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}\\\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}\end{pmatrix}$$

$$216\begin{pmatrix}1&1&0\\1&-1&1\\1&0&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}\\\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{4}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}\\\frac{4}{3}&\frac{2}{3}&-\frac{2}{3}&\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{2}{3}&\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{2}{3}\end{pmatrix}$$

$$218\begin{pmatrix}1&1&0\\1&-1&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{2}{3}&\frac{4}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}\\\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}\\\frac{2}{3}&-\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{4}{3}&\frac{2}{3}&\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}\end{pmatrix}$$

$$223\begin{pmatrix}1&1&0\\1&-1&-1\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}\\\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{4}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}\\-\frac{4}{3}&-\frac{2}{3}&\frac{2}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}&\frac{4}{3}&\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}\end{pmatrix}$$

$$227\begin{pmatrix}1&1&0\\1&-1&-1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{2}{3}&\frac{4}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}\\\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}\\-\frac{2}{3}&\frac{2}{3}&\frac{4}{3}&\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{2}{3}&\frac{2}{3}\end{pmatrix}$$

$$280\begin{pmatrix}1&-1&1\\1&0&-1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{4}{3}&\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}\\\frac{2}{3}&-\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{4}{3}&\frac{2}{3}&\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}\\\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}\end{pmatrix}$$

$$304\begin{pmatrix}1&-1&-1\\1&0&1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{4}{3}&\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{1}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}\\\frac{2}{3}&-\frac{2}{3}&-\frac{4}{3}&-\frac{2}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{4}{3}&\frac{2}{3}&\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&\frac{2}{3}&-\frac{2}{3}\\-\frac{1}{3}&\frac{1}{3}&-\frac{1}{3}&-\frac{2}{3}&-\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&-\frac{1}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&\frac{2}{3}&\frac{1}{3}&-\frac{2}{3}&-\frac{1}{3}&-\frac{1}{3}&\frac{1}{3}\end{pmatrix}$$

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$$132\begin{pmatrix}1&1&1\\1&-1&0\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\\-2&2&1&-1&-2&2&1&-1&-2&2&1&-1\\4&-2&-1&3&2&-4&-3&1&3&-3&-2&2\end{pmatrix}$$

$$135\begin{pmatrix}1&1&1\\1&-1&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&-2&1&-1&2&-2&1&-1&2&-2&1&-1\\1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\\-2&4&-1&3&-4&2&-3&1&-3&3&-2&2\end{pmatrix}$$

$$143\begin{pmatrix}1&1&1\\1&0&-1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\\4&-2&-1&3&2&-4&-3&1&3&-3&-2&2\\-2&2&1&-1&-2&2&1&-1&-2&2&1&-1\end{pmatrix}$$

$$147\begin{pmatrix}1&1&1\\1&0&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&-2&1&-1&2&-2&1&-1&2&-2&1&-1\\-2&4&-1&3&-4&2&-3&1&-3&3&-2&2\\1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$155\begin{pmatrix}1&1&1\\0&1&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}4&-2&-1&3&2&-4&-3&1&3&-3&-2&2\\-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\\-2&2&1&-1&-2&2&1&-1&-2&2&1&-1\end{pmatrix}$$

$$156\begin{pmatrix}1&1&1\\0&1&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&4&-1&3&-4&2&-3&1&-3&3&-2&2\\2&-2&1&-1&2&-2&1&-1&2&-2&1&-1\\1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$187\begin{pmatrix}1&1&-1\\1&-1&0\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\\-2&2&1&-1&-2&2&1&-1&-2&2&1&-1\\-4&2&1&-3&-2&4&3&-1&-3&3&2&-2\end{pmatrix}$$

$$190\begin{pmatrix}1&1&-1\\1&-1&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&-2&1&-1&2&-2&1&-1&2&-2&1&-1\\1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\\2&-4&1&-3&4&-2&3&-1&3&-3&2&-2\end{pmatrix}$$

$$193\begin{pmatrix}1&1&-1\\1&0&1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\\4&-2&-1&3&2&-4&-3&1&3&-3&-2&2\\2&-2&-1&1&2&-2&-1&1&2&-2&-1&1\end{pmatrix}$$

$$197\begin{pmatrix}1&1&-1\\1&0&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&-2&-1&1&2&-2&-1&1&2&-2&-1&1\\-2&4&3&-1&-4&2&1&-3&-3&3&2&-2\\-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\end{pmatrix}$$

$$208\begin{pmatrix}1&1&-1\\0&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}4&-2&-1&3&2&-4&-3&1&3&-3&-2&2\\-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\\2&-2&-1&1&2&-2&-1&1&2&-2&-1&1\end{pmatrix}$$

$$209\begin{pmatrix}1&1&-1\\0&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&4&3&-1&-4&2&1&-3&-3&3&2&-2\\2&-2&-1&1&2&-2&-1&1&2&-2&-1&1\\-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\end{pmatrix}$$

$$217\begin{pmatrix}1&1&0\\1&-1&1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-1&1&1&1&1&-1&1&-1&1&-1\\2&2&2&-2&-2&-2&-1&1&-1&1&-1&1\\4&2&3&-2&-4&-3&-1&3&-3&1&-2&2\end{pmatrix}$$

$$220\begin{pmatrix}1&1&0\\1&-1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&2&-2&-2&-2&-1&1&-1&1&-1&1\\-1&-1&-1&1&1&1&1&-1&1&-1&1&-1\\-2&-4&-3&4&2&3&3&-1&1&-3&2&-2\end{pmatrix}$$

$$225\begin{pmatrix}1&1&0\\1&-1&-1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-1&1&1&1&1&-1&1&-1&1&-1\\2&2&2&-2&-2&-2&-1&1&-1&1&-1&1\\-4&-2&-3&2&4&3&1&-3&3&-1&2&-2\end{pmatrix}$$

$$228\begin{pmatrix}1&1&0\\1&-1&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&2&-2&-2&-2&-1&1&-1&1&-1&1\\-1&-1&-1&1&1&1&1&-1&1&-1&1&-1\\2&4&3&-4&-2&-3&-3&1&-1&3&-2&2\end{pmatrix}$$

$$279\begin{pmatrix}1&-1&1\\1&0&-1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\\-4&2&1&-3&-2&4&3&-1&-3&3&2&-2\\-2&2&1&-1&-2&2&1&-1&-2&2&1&-1\end{pmatrix}$$

$$283\begin{pmatrix}1&-1&1\\1&0&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&-2&1&-1&2&-2&1&-1&2&-2&1&-1\\2&-4&1&-3&4&-2&3&-1&3&-3&2&-2\\1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$289\begin{pmatrix}1&-1&1\\0&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&4&3&-1&-4&2&1&-3&-3&3&2&-2\\-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\\2&-2&-1&1&2&-2&-1&1&2&-2&-1&1\end{pmatrix}$$

$$290\begin{pmatrix}1&-1&1\\0&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}4&-2&-1&3&2&-4&-3&1&3&-3&-2&2\\2&-2&-1&1&2&-2&-1&1&2&-2&-1&1\\-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\end{pmatrix}$$

$$302\begin{pmatrix}1&-1&-1\\1&0&1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\\-4&2&1&-3&-2&4&3&-1&-3&3&2&-2\\2&-2&-1&1&2&-2&-1&1&2&-2&-1&1\end{pmatrix}$$

$$306\begin{pmatrix}1&-1&-1\\1&0&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&-2&-1&1&2&-2&-1&1&2&-2&-1&1\\2&-4&-3&1&4&-2&-1&3&3&-3&-2&2\\-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\end{pmatrix}$$

$$319\begin{pmatrix}1&-1&-1\\0&1&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&4&3&-1&-4&2&1&-3&-3&3&2&-2\\-1&1&1&-1&-1&1&1&-1&-1&1&1&-1\\-2&2&1&-1&-2&2&1&-1&-2&2&1&-1\end{pmatrix}$$

$$320\begin{pmatrix}1&-1&-1\\0&1&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}4&-2&3&-1&2&-4&1&-3&3&-3&2&-2\\2&-2&1&-1&2&-2&1&-1&2&-2&1&-1\\1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

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$$136\begin{pmatrix}1&1&1\\1&-1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&1&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}\\1&-1&1&-1&-1&1&-1&1&-1&1&1&-1\end{pmatrix}$$

$$146\begin{pmatrix}1&1&1\\1&0&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}\\1&-1&1&-1&-1&1&-1&1&-1&1&1&-1\\-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&1&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$149\begin{pmatrix}1&1&1\\1&0&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&-1&1&1&1&-1&-1&1&-1\\\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&1&-\frac{3}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$191\begin{pmatrix}1&1&-1\\1&-1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}\\1&-1&1&-1&1&1&-1&1&-1&-1&1&-1\end{pmatrix}$$

$$196\begin{pmatrix}1&1&-1\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}\\1&-1&1&-1&-1&1&-1&1&-1&1&1&-1\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$203\begin{pmatrix}1&1&-1\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&-1&1&1&1&-1&-1&1&-1\\\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{3}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$221\begin{pmatrix}1&1&0\\1&-1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-1&1&\frac{1}{2}&-\frac{1}{2}\\1&-1&1&-1&1&-1&1&-1&-1&1&1&-1\end{pmatrix}$$

$$229\begin{pmatrix}1&1&0\\1&-1&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&1&-1&\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&1&-\frac{1}{2}&\frac{1}{2}\\1&-1&1&-1&1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$282\begin{pmatrix}1&-1&1\\1&0&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{1}{2}&-\frac{1}{2}\\1&-1&1&-1&1&1&-1&1&-1&-1&1&-1\\\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$284\begin{pmatrix}1&-1&1\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&-1&1&1&1&-1&-1&1&-1\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{3}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$305\begin{pmatrix}1&-1&-1\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{1}{2}&-\frac{1}{2}\\1&-1&1&-1&1&1&-1&1&-1&-1&1&-1\\-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-1&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$313\begin{pmatrix}1&-1&-1\\1&0&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&-1&1&1&1&-1&-1&1&-1\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{3}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-1&\frac{1}{2}&\frac{3}{2}&1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

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$$150\begin{pmatrix}1&1&1\\1&0&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&1&-1&-1&1&-1\\1&-1&1&-1&1&-1&1&-1&1&-1\\-1&1&1&3&-3&-1&-1&1&-2&2\end{pmatrix}$$

$$151\begin{pmatrix}1&1&1\\1&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&1&-1&-1&1&-1\\-1&1&1&3&-3&-1&-1&1&-2&2\\1&-1&1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$157\begin{pmatrix}1&1&1\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&1&1&3&-3&-1&-1&1&-2&2\\1&1&-1&-1&1&1&-1&-1&1&-1\\1&-1&1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$205\begin{pmatrix}1&1&-1\\1&0&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&1&-1&-1&1&-1\\1&-1&1&-1&1&-1&1&-1&1&-1\\1&-1&-1&-3&3&1&1&-1&2&-2\end{pmatrix}$$

$$206\begin{pmatrix}1&1&-1\\1&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&1&-1&-1&1&-1\\1&-1&3&1&-1&-3&1&-1&-2&2\\1&-1&1&-1&1&-1&1&-1&-1&1\end{pmatrix}$$

$$212\begin{pmatrix}1&1&-1\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&-1&3&1&-1&-3&1&-1&-2&2\\1&1&-1&-1&1&1&-1&-1&1&-1\\1&-1&1&-1&1&-1&1&-1&-1&1\end{pmatrix}$$

$$286\begin{pmatrix}1&-1&1\\1&0&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&1&-1&-1&1&-1\\1&-1&1&-1&1&-1&1&-1&-1&1\\1&-1&3&1&-1&-3&1&-1&-2&2\end{pmatrix}$$

$$287\begin{pmatrix}1&-1&1\\1&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&1&-1&-1&1&-1\\1&-1&-1&-3&3&1&1&-1&2&-2\\1&-1&1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$293\begin{pmatrix}1&-1&1\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&3&-1&1&-1&1&-3&-1&2&-2\\1&1&-1&-1&1&1&-1&-1&1&-1\\1&-1&1&-1&1&-1&1&-1&-1&1\end{pmatrix}$$

$$314\begin{pmatrix}1&-1&-1\\1&0&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&1&-1&-1&1&-1\\1&-1&1&-1&1&-1&1&-1&-1&1\\-1&1&-3&-1&1&3&-1&1&2&-2\end{pmatrix}$$

$$315\begin{pmatrix}1&-1&-1\\1&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&-1&-1&1&1&-1&-1&1&-1\\-1&1&-3&-1&1&3&-1&1&2&-2\\1&-1&1&-1&1&-1&1&-1&-1&1\end{pmatrix}$$

$$321\begin{pmatrix}1&-1&-1\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}3&1&1&-1&1&-1&-1&-3&2&-2\\1&1&-1&-1&1&1&-1&-1&1&-1\\1&-1&1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

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$$230\begin{pmatrix}1&1&0\\1&-1&0\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$231\begin{pmatrix}1&1&0\\1&-1&0\\1&0&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$233\begin{pmatrix}1&1&0\\1&-1&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}\end{pmatrix}$$

$$234\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ -\frac{1}{2} & \frac{3}{2} & \frac{1}{2} & -\frac{3}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{3}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{3}{2} & \frac{1}{2}\end{pmatrix}$$

$$237\begin{pmatrix}1 & 1 & 0\\ 1 & 0 & 1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & \frac{3}{2} & \frac{1}{2} & \frac{3}{2} & -\frac{3}{2} & -\frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$252\begin{pmatrix}1 & 1 & 0\\ 0 & 1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{3}{2} & \frac{1}{2} & \frac{3}{2} & -\frac{3}{2} & -\frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$322\begin{pmatrix}1 & -1 & 0\\ 1 & 0 & 1\\ 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -\frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & -\frac{3}{2} & \frac{3}{2} & \frac{1}{2} & \frac{3}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$337\begin{pmatrix}1 & -1 & 0\\ 0 & 1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{3}{2} & \frac{1}{2} & \frac{3}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & -\frac{3}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$344\begin{pmatrix}1 & 0 & 1\\ 1 & 0 & -1\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & \frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2}\\ \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$345\begin{pmatrix}1 & 0 & 1\\ 1 & 0 & -1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ \frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & \frac{3}{2} & -\frac{1}{2} & \frac{1}{2}\\ \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$352\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{3}{2} & \frac{3}{2} & \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$362\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{3}{2} & \frac{1}{2} & \frac{1}{2} & \frac{3}{2} & -\frac{1}{2} & -\frac{3}{2} & -\frac{3}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

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$$236\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$$

$$346\begin{pmatrix}1 & 0 & 1\\ 1 & 0 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ 1 & -1 & 1 & -1 & 1 & -1 & 1 & -1\\ \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$368\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & 1 & -1 & -1 & -1 & -1\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

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$$238\begin{pmatrix}1 & 1 & 0\\ 1 & 0 & 1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & -1 & 1 & 1 & -1 & 1 & 1 & -1\\ 2 & 2 & -2 & -2 & 1 & -1 & -1 & 1\\ 2 & 1 & -2 & -1 & 2 & -2 & -1 & 1\end{pmatrix}$$

$$243\begin{pmatrix}1 & 1 & 0\\ 1 & 0 & -1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & -1 & 1 & 1 & -1 & 1 & 1 & -1\\ 2 & 2 & -2 & -2 & 1 & -1 & -1 & 1\\ -2 & -1 & 2 & 1 & -2 & 2 & 1 & -1\end{pmatrix}$$

$$253\begin{pmatrix}1 & 1 & 0\\ 0 & 1 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 2 & -2 & -2 & 1 & -1 & -1 & 1\\ -1 & -1 & 1 & 1 & -1 & 1 & 1 & -1\\ 2 & 1 & -2 & -1 & 2 & -2 & -1 & 1\end{pmatrix}$$

$$255\begin{pmatrix}1 & 1 & 0\\ 0 & 1 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 2 & -2 & -2 & 1 & -1 & -1 & 1\\ -1 & -1 & 1 & 1 & -1 & 1 & 1 & -1\\ -2 & -1 & 2 & 1 & -2 & 2 & 1 & -1\end{pmatrix}$$

$$323\begin{pmatrix}1 & -1 & 0\\ 1 & 0 & 1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & -1 & 1 & 1 & -1 & 1 & 1 & -1\\ -2 & -2 & 2 & 2 & -1 & 1 & 1 & -1\\ 2 & 1 & -2 & -1 & 2 & -2 & -1 & 1\end{pmatrix}$$

$$328\begin{pmatrix}1 & -1 & 0\\ 1 & 0 & -1\\ 1 & 0 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & -1 & 1 & 1 & -1 & 1 & 1 & -1\\ -2 & -2 & 2 & 2 & -1 & 1 & 1 & -1\\ -2 & -1 & 2 & 1 & -2 & 2 & 1 & -1\end{pmatrix}$$

$$338\begin{pmatrix}1 & -1 & 0\\ 0 & 1 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 2 & -2 & -2 & -1 & 1 & 1 & -1\\ 1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\\ -2 & -1 & 2 & 1 & 2 & -2 & -1 & 1\end{pmatrix}$$

$$340\begin{pmatrix}1 & -1 & 0\\ 0 & 1 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 2 & -2 & -2 & -1 & 1 & 1 & -1\\ 1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\\ 2 & 1 & -2 & -1 & -2 & 2 & 1 & -1\end{pmatrix}$$

$$354\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 2 & -2 & -2 & 1 & -1 & -1 & 1\\ 2 & 1 & -2 & -1 & 2 & -2 & -1 & 1\\ -1 & -1 & 1 & 1 & -1 & 1 & 1 & -1\end{pmatrix}$$

$$356\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & -1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 2 & -2 & -2 & -1 & 1 & -1 & 1\\ -2 & -1 & 2 & 1 & 2 & -2 & 1 & -1\\ -1 & -1 & 1 & 1 & 1 & -1 & 1 & -1\end{pmatrix}$$

$$364\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 2 & -2 & -2 & -1 & 1 & 1 & -1\\ -2 & -1 & 2 & 1 & 2 & -2 & -1 & 1\\ 1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{pmatrix}$$

$$366\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & -1\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 2 & -2 & -2 & 1 & -1 & 1 & -1\\ 2 & 1 & -2 & -1 & 2 & -2 & 1 & -1\\ 1 & 1 & -1 & -1 & 1 & -1 & 1 & -1\end{pmatrix}$$

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$$239\begin{pmatrix}1&1&0\\1&0&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$245\begin{pmatrix}1&1&0\\1&0&-1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$325\begin{pmatrix}1&-1&0\\1&0&1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$329\begin{pmatrix}1&-1&0\\1&0&-1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

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$$240\begin{pmatrix}1&1&0\\1&0&1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&-1\\0&0&0\end{pmatrix}\begin{pmatrix}1&0&-1&0&1&-1&0\\0&1&0&-1&-1&1&0\\0&0&0&0&0&0&0\end{pmatrix}$$

$$244\begin{pmatrix}1&1&0\\1&0&-1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&-1\\0&1&1\\0&0&0\end{pmatrix}\begin{pmatrix}1&0&-1&0&1&-1&0\\0&1&0&-1&-1&1&0\\0&0&0&0&0&0&0\end{pmatrix}$$

$$324\begin{pmatrix}1&-1&0\\1&0&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&1\\0&0&0\end{pmatrix}\begin{pmatrix}1&0&-1&0&1&-1&0\\0&-1&0&1&1&-1&0\\0&0&0&0&0&0&0\end{pmatrix}$$

$$330\begin{pmatrix}1&-1&0\\1&0&-1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&-1\\0&1&-1\\0&0&0\end{pmatrix}\begin{pmatrix}1&0&-1&0&1&-1&0\\0&-1&0&1&1&-1&0\\0&0&0&0&0&0&0\end{pmatrix}$$

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$$241\begin{pmatrix}1&1&0\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&2&-2&-2&-2&-1&1&-1&1\\-1&-1&-1&1&1&1&1&-1&1&-1\\-1&-3&-2&3&1&2&2&-2&1&-1\end{pmatrix}$$

$$242\begin{pmatrix}1&1&0\\1&0&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&-2&-1&2&-2&1&2&-2&-1&1\\-1&3&2&-3&1&-2&-2&2&1&-1\\-1&1&1&-1&1&-1&-1&1&1&-1\end{pmatrix}$$

$$246\begin{pmatrix}1&1&0\\1&0&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&2&-2&-2&-2&-1&1&-1&1\\-1&-1&-1&1&1&1&1&-1&1&-1\\1&3&2&-3&-1&-2&-2&2&-1&1\end{pmatrix}$$

$$247\begin{pmatrix}1&1&0\\1&0&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&-2&-1&2&-2&1&2&-2&1&-1\\-1&3&2&-3&1&-2&-2&2&-1&1\\1&-1&-1&1&-1&1&1&-1&1&-1\end{pmatrix}$$

$$248\begin{pmatrix}1&1&0\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-1&1&1&1&1&1&-1&-1\\2&2&2&-2&-2&-2&-1&-1&1&1\\-1&-3&-2&3&1&2&2&1&-2&-1\end{pmatrix}$$

$$249\begin{pmatrix}1&1&0\\1&0&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-1&1&1&1&1&1&-1&-1\\2&2&2&-2&-2&-2&-1&-1&1&1\\1&3&2&-3&-1&-2&-2&-1&2&1\end{pmatrix}$$

$$254\begin{pmatrix}1&1&0\\0&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&3&2&-3&1&-2&-2&2&1&-1\\2&-2&-1&2&-2&1&2&-2&-1&1\\-1&1&1&-1&1&-1&-1&1&1&-1\end{pmatrix}$$

$$256\begin{pmatrix}1&1&0\\0&1&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&3&2&-3&1&-2&-2&2&-1&1\\2&-2&-1&2&-2&1&2&-2&1&-1\\1&-1&-1&1&-1&1&1&-1&1&-1\end{pmatrix}$$

$$326\begin{pmatrix}1&-1&0\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&2&-2&-2&-2&-1&1&1&-1\\1&1&1&-1&-1&-1&-1&1&1&-1\\-1&-3&-2&3&1&2&2&-2&-1&1\end{pmatrix}$$

$$327\begin{pmatrix}1&-1&0\\1&0&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&-2&-1&2&-2&1&2&-2&-1&1\\1&-3&-2&3&-1&2&2&-2&-1&1\\-1&1&1&-1&1&-1&-1&1&1&-1\end{pmatrix}$$

$$331\begin{pmatrix}1&-1&0\\1&0&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&2&-2&-2&-2&-1&1&1&-1\\1&1&1&-1&-1&-1&-1&1&1&-1\\1&3&2&-3&-1&-2&-2&2&1&-1\end{pmatrix}$$

$$332\begin{pmatrix}1&-1&0\\1&0&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&-2&-1&2&-2&1&2&-2&1&-1\\1&-3&-2&3&-1&2&2&-2&1&-1\\1&-1&-1&1&-1&1&1&-1&1&-1\end{pmatrix}$$

$$333\begin{pmatrix}1&-1&0\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-1&1&1&1&1&1&-1&-1\\-2&-2&-2&2&2&2&1&1&-1&-1\\3&1&2&-1&-3&-2&-2&-1&2&1\end{pmatrix}$$

$$334\begin{pmatrix}1&-1&0\\1&0&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-1&1&1&1&1&1&-1&-1\\-2&-2&-2&2&2&2&1&1&-1&-1\\-3&-1&-2&1&3&2&2&1&-2&-1\end{pmatrix}$$

$$339\begin{pmatrix}1&-1&0\\0&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}3&-1&2&1&-3&-2&2&-2&-1&1\\2&-2&1&2&-2&-1&2&-2&-1&1\\-1&1&-1&-1&1&1&-1&1&1&-1\end{pmatrix}$$

$$341\begin{pmatrix}1&-1&0\\0&1&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}3&-1&2&1&-3&-2&2&-2&1&-1\\2&-2&1&2&-2&-1&2&-2&1&-1\\1&-1&1&1&-1&-1&1&-1&1&-1\end{pmatrix}$$

$$348\begin{pmatrix}1&0&1\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-1&1&1&1&1&1&-1&-1\\-1&-3&-2&3&1&2&2&1&-2&-1\\2&2&2&-2&-2&-2&-1&-1&1&1\end{pmatrix}$$

$$349\begin{pmatrix}1&0&1\\1&0&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-1&1&1&1&1&1&-1&-1\\3&1&2&-1&-3&-2&-2&-1&2&1\\2&2&2&-2&-2&-2&-1&-1&1&1\end{pmatrix}$$

$$353\begin{pmatrix}1&0&1\\0&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&3&2&-3&1&-2&-2&2&1&-1\\-1&1&1&-1&1&-1&-1&1&1&-1\\2&-2&-1&2&-2&1&2&-2&-1&1\end{pmatrix}$$

$$355\begin{pmatrix}1&0&1\\0&1&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}3&-1&2&1&-3&-2&2&-2&-1&1\\-1&1&-1&-1&1&1&-1&1&1&-1\\-2&2&-1&-2&2&1&-2&2&1&-1\end{pmatrix}$$

$$358\begin{pmatrix}1&0&-1\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-1&1&1&1&1&1&-1&-1\\3&1&2&-1&-3&-2&-2&-1&2&1\\-2&-2&-2&2&2&2&1&1&-1&-1\end{pmatrix}$$

$$359\begin{pmatrix}1&0&-1\\1&0&0\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-1&1&1&1&1&1&-1&-1\\-1&-3&-2&3&1&2&2&1&-2&-1\\-2&-2&-2&2&2&2&1&1&-1&-1\end{pmatrix}$$

$$363\begin{pmatrix}1&0&-1\\0&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}3&-1&2&1&-3&-2&2&-2&-1&1\\-1&1&-1&-1&1&1&-1&1&1&-1\\2&-2&1&2&-2&-1&2&-2&-1&1\end{pmatrix}$$

$$365\begin{pmatrix}1&0&-1\\0&1&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&3&2&-3&1&-2&-2&2&1&-1\\-1&1&1&-1&1&-1&-1&1&1&-1\\-2&2&1&-2&2&-1&-2&2&1&-1\end{pmatrix}$$

Grup 30

$$251\begin{pmatrix}1&1&0\\1&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&1&1&1&1&-1&-1\\2&2&-2&-2&-1&-1&1&1\\1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$257\begin{pmatrix}1&1&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&-2&-2&-1&-1&1&1\\-1&-1&1&1&1&1&-1&-1\\1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$336\begin{pmatrix}1&-1&0\\1&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&1&1&1&1&-1&-1\\-2&-2&2&2&1&1&-1&-1\\1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$342\begin{pmatrix}1&-1&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&-2&-2&1&1&-1&-1\\1&1&-1&-1&1&1&-1&-1\\1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

$$350\begin{pmatrix}1&0&1\\1&0&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&1&1&1&1&-1&-1\\1&-1&1&-1&1&-1&1&-1\\2&2&-2&-2&-1&-1&1&1\end{pmatrix}$$

$$357\begin{pmatrix}1&0&1\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&-2&-2&-1&1&-1&1\\1&-1&1&-1&1&1&-1&-1\\-1&-1&1&1&1&-1&1&-1\end{pmatrix}$$

$$360\begin{pmatrix}1&0&-1\\1&0&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&1&1&1&1&-1&-1\\1&-1&1&-1&1&-1&1&-1\\-2&-2&2&2&1&1&-1&-1\end{pmatrix}$$

$$367\begin{pmatrix}1&0&-1\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&2&-2&-2&1&-1&1&-1\\1&-1&1&-1&1&1&-1&-1\\1&1&-1&-1&1&-1&1&-1\end{pmatrix}$$

$$369\begin{pmatrix}1&0&0\\0&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&1&1&-1&-1&-1&-1\\-1&1&1&-1&-1&1&1&-1\\2&-2&-1&1&2&-2&-1&1\end{pmatrix}$$

$$370\begin{pmatrix}1&0&0\\0&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&1&1&-1&-1&-1&-1\\2&-2&-1&1&2&-2&-1&1\\-1&1&1&-1&-1&1&1&-1\end{pmatrix}$$

$$371\begin{pmatrix}1&0&0\\0&1&-1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&1&1&-1&-1&-1&-1\\-1&1&1&-1&-1&1&1&-1\\-2&2&1&-1&-2&2&1&-1\end{pmatrix}$$

$$372\begin{pmatrix}1&0&0\\0&1&-1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&1&1&-1&-1&-1&-1\\2&-2&1&-1&2&-2&1&-1\\1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

Grup 31

$$373\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&1&1&-1&-1&-1&-1\\1&1&-1&-1&1&1&-1&-1\\1&-1&1&-1&1&-1&1&-1\end{pmatrix}$$

Teorem 4.4'ün çıktıları

Grup 1

$1(1\quad 1\quad 1\quad 1)(1\quad 1\quad 1\quad 1)(1\quad -1\quad 0)$

$2(1\quad 1\quad 1\quad -1)(1\quad 1\quad 1\quad -1)(1\quad -1\quad 0)$

$3(1\quad 1\quad -1\quad 1)(1\quad 1\quad -1\quad 1)(1\quad -1\quad 0)$

$4(1\quad 1\quad -1\quad -1)(1\quad 1\quad -1\quad -1)(1\quad -1\quad 0)$

$5(1\quad -1\quad 1\quad 1)(1\quad -1\quad 1\quad 1)(1\quad -1\quad 0)$

$6(1\quad -1\quad 1\quad -1)(1\quad -1\quad 1\quad -1)(1\quad -1\quad 0)$

$7(1\quad -1\quad -1\quad 1)(1\quad -1\quad -1\quad 1)(1\quad -1\quad 0)$

$8(1\quad -1\quad -1\quad -1)(1\quad -1\quad -1\quad -1)(1\quad -1\quad 0)$

Grup 2

$$9\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$10\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 0 & 1\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$12\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & -1 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1 & 1\\ 0 & 1 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$15\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 0 & \frac{1}{2} & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$17\begin{pmatrix}1 & 1 & 1 & -1\\ 1 & 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & 0 & -1\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$19\begin{pmatrix}1 & 1 & 1 & -1\\ 1 & -1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 1 & -1\\ 0 & 1 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$20\begin{pmatrix}1 & 1 & 1 & -1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 0 & \frac{1}{2} & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$22\begin{pmatrix}1 & 1 & -1 & 1\\ 1 & 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & -1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$24\begin{pmatrix}1 & 1 & -1 & 1\\ 1 & -1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 0 & \frac{1}{2} & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$25\begin{pmatrix}1 & 1 & -1 & 1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & -1 & 1\\ 0 & 1 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$27\begin{pmatrix}1 & 1 & -1 & -1\\ 1 & -1 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 0 & \frac{1}{2} & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$30\begin{pmatrix}1 & 1 & -1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1 & -1\\ 0 & 1 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$31\begin{pmatrix}1 & -1 & 1 & 1\\ 1 & -1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & -1 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$32\begin{pmatrix}1 & -1 & 1 & 1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 1\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$35\begin{pmatrix}1 & -1 & 1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & -1\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$36\begin{pmatrix}1 & -1 & -1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & -1 & -1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

Grup 3

$$11\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & 0 & 0\\ 0 & 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$13\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & -1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 1 & 0\\ 0 & 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$14\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 1\\ 0 & 1 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$16\begin{pmatrix}1 & 1 & 1 & -1\\ 1 & 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 0 & 0\\ 0 & 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$18\begin{pmatrix}1 & 1 & 1 & -1\\ 1 & -1 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1 & 0\\ 0 & 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$21\begin{pmatrix}1 & 1 & 1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & -1\\ 0 & 1 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$23\begin{pmatrix}1 & 1 & -1 & 1\\ 1 & -1 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 1\\ 0 & 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$26\begin{pmatrix}1 & 1 & -1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1 & 0\\ 0 & 1 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$28\begin{pmatrix}1 & 1 & -1 & -1\\ 1 & -1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & -1\\ 0 & 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$29\begin{pmatrix}1 & 1 & -1 & -1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & -1 & 0\\ 0 & 1 & 0 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$33\begin{pmatrix}1 & -1 & 1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 0\\ 0 & 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

$$34\begin{pmatrix}1 & -1 & 1 & -1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & -1 & 0 & 0\\ 0 & 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$$

Grup 4

$$37\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\\ 1 & 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & -\frac{1}{2} & -\frac{1}{2} & 0 & 1 & \frac{1}{2} & \frac{1}{2} & 0 & 1 & 0 & 0 & -1\\ 1 & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$38\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\\ 1 & 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & 0 & -1 & -\frac{1}{2} & 0 & -1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$39\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\\ 1 & -1 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & -\frac{1}{2} & -\frac{1}{2} & 0 & 1 & \frac{1}{2} & \frac{1}{2} & 0 & 1 & 0 & 0 & -1\\ 1 & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$40\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\\ 1 & -1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 1 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & 0 & -1 & -\frac{1}{2} & 0 & -1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$41\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\\ 1 & \frac{1}{2} & 0 & 1 & -1 & -\frac{1}{2} & -1 & 0 & -\frac{1}{2} & 0 & \frac{1}{2} & 0\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$42\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & 0 & 1 & \frac{1}{2} & \frac{1}{2} & 0 & 0 & 1 & -1 & 0\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$43\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & 1\\ 1 & 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & 0 & -1 & -\frac{1}{2} & 0 & -1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\end{pmatrix}$$

$$44\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & 1\\ 1 & -1 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 1\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}-1 & -\frac{1}{2} & -\frac{1}{2} & 0 & 1 & \frac{1}{2} & \frac{1}{2} & 0 & 1 & 0 & 0 & -1\\ 1 & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$45\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & 1\\ 1 & -1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 1\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}-1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\\ 1 & \frac{1}{2} & 0 & 1 & -1 & -\frac{1}{2} & -1 & 0 & -\frac{1}{2} & 0 & \frac{1}{2} & 0\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$46\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & 1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 1\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & 0 & -1 & -\frac{1}{2} & 0 & -1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$47\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 1\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & 0 & 1 & \frac{1}{2} & \frac{1}{2} & 0 & 0 & 1 & -1 & 0\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$48\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & -1\\ 1 & -1 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & -1 & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & 1 & \frac{1}{2} & 1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 0 & 1 & 1 & \frac{1}{2} & -1 & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0 & 0\end{pmatrix}$$

$$51\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & 1 & \frac{1}{2} & 1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & -1 & -\frac{1}{2} & \frac{1}{2}\\ 0 & 1 & 1 & \frac{1}{2} & -1 & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0 & 0\end{pmatrix}$$

$$52\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & -1 & 1 & 1\\ 1 & -1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 1 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & 0 & -1 & -\frac{1}{2} & 0 & -1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\end{pmatrix}$$

$$53\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & -1 & 1 & 1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 1\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & 0 & -1 & -\frac{1}{2} & 0 & -1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\end{pmatrix}$$

$$54\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & -1 & 1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & 0 & 1 & \frac{1}{2} & \frac{1}{2} & 0 & 0 & 1 & -1 & 0\end{pmatrix}$$

$$56\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & -1 & 1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 1\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}\frac{1}{2} & 1 & \frac{1}{2} & 1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 0 & 1 & 1 & \frac{1}{2} & -1 & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0 & 0\\ \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & -1 & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$57\begin{pmatrix}1&1&1&1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&1&\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\0&1&1&\frac{1}{2}&-1&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0\\\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$58\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&1&-1&-1\end{pmatrix}\begin{pmatrix}1&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&1&0&\frac{1}{2}&0&-1&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&0\\1&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$60\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&-1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&-1&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&1&\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&1&1&\frac{1}{2}&-1&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0\end{pmatrix}$$

$$61\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&-1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&1&\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\\0&1&1&\frac{1}{2}&-1&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0\end{pmatrix}$$

$$63\begin{pmatrix}1&1&1&-1\\1&1&-1&-1\\1&-1&1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&-1\\0&0&1&0\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\1&\frac{1}{2}&0&1&-1&-\frac{1}{2}&-1&0&-\frac{1}{2}&0&\frac{1}{2}&0\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$64\begin{pmatrix}1&1&1&-1\\1&1&-1&-1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&-1\\0&1&0&0\\0&0&1&0\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&-\frac{1}{2}&0&1&\frac{1}{2}&\frac{1}{2}&0&1&0&0&-1\\1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$65\begin{pmatrix}1&1&1&-1\\1&1&-1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&-1\\0&0&1&0\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&0&1&\frac{1}{2}&\frac{1}{2}&0&0&1&-1&0\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$66\begin{pmatrix}1&1&1&-1\\1&1&-1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&-1\\0&1&0&0\\0&0&1&0\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&0&\frac{1}{2}&0\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$67\begin{pmatrix}1&1&1&-1\\1&-1&1&1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&1&0\\0&1&0&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&1&0&\frac{1}{2}&0&-1&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&0\\1&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$68\begin{pmatrix}1&1&1&-1\\1&-1&1&1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&-1\\0&0&1&0\end{pmatrix}\begin{pmatrix}\frac{1}{2}&1&\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\0&1&1&\frac{1}{2}&-1&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0\\\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$70\begin{pmatrix}1&1&1&-1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&-1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&0&1&\frac{1}{2}&\frac{1}{2}&0&0&1&-1&0\end{pmatrix}$$

$$71\begin{pmatrix}1&1&1&-1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&-1\\0&1&0&0\\0&0&1&0\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&0&\frac{1}{2}&0\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$72\begin{pmatrix}1&1&1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\1&\frac{1}{2}&0&1&-1&-\frac{1}{2}&-1&0&\frac{1}{2}&0&-\frac{1}{2}&0\\1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$73\begin{pmatrix}1&1&-1&1\\1&1&-1&-1\\1&-1&1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&-1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\1&\frac{1}{2}&0&1&-1&-\frac{1}{2}&-1&0&-\frac{1}{2}&0&\frac{1}{2}&0\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$74\begin{pmatrix}1&1&-1&1\\1&1&-1&-1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&-1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&0&1&\frac{1}{2}&\frac{1}{2}&0&0&1&-1&0\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$75\begin{pmatrix}1&1&-1&1\\1&1&-1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&-1&0\\0&1&0&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&-\frac{1}{2}&0&1&\frac{1}{2}&\frac{1}{2}&0&1&0&0&-1\\1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$76\begin{pmatrix}1&1&-1&1\\1&1&-1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&-1&0\\0&1&0&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&0&\frac{1}{2}&0\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$77\begin{pmatrix}1&1&-1&1\\1&-1&1&1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&-1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&1&\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\0&1&1&\frac{1}{2}&-1&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0\\\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$78\begin{pmatrix}1 & 1 & -1 & 1\\ 1 & -1 & 1 & 1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 1\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & 0 & \frac{1}{2} & 0 & -1 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0 & 0\\ 1 & \frac{1}{2} & \frac{1}{2} & 1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -1 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & 1 & -1 & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$80\begin{pmatrix}1 & 1 & -1 & 1\\ 1 & -1 & 1 & -1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & \frac{1}{2} & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & -\frac{1}{2} & 0 & 0 & 1 & -1 & 0\end{pmatrix}$$

$$81\begin{pmatrix}1 & 1 & -1 & 1\\ 1 & -1 & 1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 1\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & 0 & 1 & -1 & -\frac{1}{2} & -1 & 0 & \frac{1}{2} & 0 & -\frac{1}{2} & 0\\ 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\end{pmatrix}$$

$$82\begin{pmatrix}1 & 1 & -1 & 1\\ 1 & -1 & -1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & 1 & 0 & -1 & -\frac{1}{2} & 0 & -1 & -\frac{1}{2} & 0 & \frac{1}{2} & 0\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\end{pmatrix}$$

$$83\begin{pmatrix}1 & 1 & -1 & -1\\ 1 & -1 & 1 & 1\\ 1 & -1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & -1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & 0 & 1 & -1 & -\frac{1}{2} & -1 & 0 & \frac{1}{2} & 0 & -\frac{1}{2} & 0\\ 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\end{pmatrix}$$

$$84\begin{pmatrix}1 & 1 & -1 & -1\\ 1 & -1 & 1 & 1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & -1\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & 0 & 1 & -1 & -\frac{1}{2} & -1 & 0 & \frac{1}{2} & 0 & -\frac{1}{2} & 0\\ 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2}\end{pmatrix}$$

$$85\begin{pmatrix}1 & 1 & -1 & -1\\ 1 & -1 & 1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & \frac{1}{2} & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & -\frac{1}{2} & 0 & 0 & 1 & -1 & 0\end{pmatrix}$$

$$87\begin{pmatrix}1 & 1 & -1 & -1\\ 1 & -1 & 1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & -1\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & 0 & \frac{1}{2} & 0 & -1 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0 & 0\\ 1 & \frac{1}{2} & \frac{1}{2} & 1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -1 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & 1 & -1 & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$88\begin{pmatrix}1 & 1 & -1 & -1\\ 1 & -1 & -1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & 0 & \frac{1}{2} & 0 & -1 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0 & 0\\ 1 & \frac{1}{2} & \frac{1}{2} & 1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -1 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & 1 & -1 & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

$$89\begin{pmatrix}1&-1&1&1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&-1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&-\frac{1}{2}&0&1&\frac{1}{2}&\frac{1}{2}&0&1&0&0&-1\\1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$90\begin{pmatrix}1&-1&1&1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&-1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&0&\frac{1}{2}&0\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$91\begin{pmatrix}1&-1&1&1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&-1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&0&\frac{1}{2}&0\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$92\begin{pmatrix}1&-1&1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&-1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&1&0&\frac{1}{2}&0&-1&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&0\\1&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

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$$49\begin{pmatrix}1&1&1&1\\1&1&-1&-1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&-1\\0&1&0&1\\0&0&1&1\end{pmatrix}\begin{pmatrix}1&0&\frac{1}{2}&0&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&1&0&\frac{1}{2}&0&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&1&0&\frac{1}{2}&0&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0\\0&1&\frac{1}{2}&0&1&\frac{1}{2}&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-1&0&-\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&-\frac{1}{2}&\frac{1}{2}&0&-\frac{1}{2}&\frac{1}{2}&0\\0&0&0&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&0&0&0&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&0&0&0\end{pmatrix}$$

$$50\begin{pmatrix}1&1&1&1\\1&1&-1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&1\\0&1&0&-1\\0&0&1&1\end{pmatrix}\begin{pmatrix}1&0&\frac{1}{2}&1&0&\frac{1}{2}&1&0&\frac{1}{2}&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&\frac{1}{2}&-\frac{1}{2}&0&\frac{1}{2}&-\frac{1}{2}&0\\0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0\\0&0&0&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&0&0&0&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&0&0&0\end{pmatrix}$$

$$55\begin{pmatrix}1&1&1&1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&1\\0&1&0&1\\0&0&1&-1\end{pmatrix}\begin{pmatrix}1&0&\frac{1}{2}&1&0&\frac{1}{2}&1&0&\frac{1}{2}&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&\frac{1}{2}&-\frac{1}{2}&0&\frac{1}{2}&-\frac{1}{2}&0\\0&0&0&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&0&0&0&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&0&0&0\\0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0\end{pmatrix}$$

$$59\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&-1&1&1\end{pmatrix}\begin{pmatrix}1&0&0&1\\0&1&0&-1\\0&0&1&-1\end{pmatrix}\begin{pmatrix}1&0&\frac{1}{2}&0&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&1&0&\frac{1}{2}&0&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&1&0&\frac{1}{2}&0&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0\\0&1&\frac{1}{2}&0&1&\frac{1}{2}&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-1&0&-\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&-\frac{1}{2}&\frac{1}{2}&0&-\frac{1}{2}&\frac{1}{2}&0\\0&0&0&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&0&0&0&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&0&0&0\end{pmatrix}$$

$$62\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&-1\\0&1&0&1\\0&0&1&-1\end{pmatrix}\begin{pmatrix}1&0&\frac{1}{2}&1&0&\frac{1}{2}&1&0&\frac{1}{2}&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&\frac{1}{2}&-\frac{1}{2}&0&\frac{1}{2}&-\frac{1}{2}&0\\0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0\\0&0&0&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&0&0&0&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&0&0&0\end{pmatrix}$$

$$69\begin{pmatrix}1&1&1&-1\\1&-1&1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&-1\\0&1&0&-1\\0&0&1&1\end{pmatrix}\begin{pmatrix}1&0&\frac{1}{2}&1&0&\frac{1}{2}&1&0&\frac{1}{2}&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&0&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&0&\frac{1}{2}&-\frac{1}{2}&0&\frac{1}{2}&-\frac{1}{2}&0\\0&0&0&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&0&0&0&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&0&0&0\\0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0\end{pmatrix}$$

$$79\begin{pmatrix}1&1&-1&1\\1&-1&1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&1\\0&1&0&1\\0&0&1&1\end{pmatrix}\begin{pmatrix}1&1&1&0&0&0&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&0&0&0&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&0&0&0\\0&1&\frac{1}{2}&0&1&\frac{1}{2}&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-1&0&-\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&-\frac{1}{2}&\frac{1}{2}&0&-\frac{1}{2}&\frac{1}{2}&0\\0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0\end{pmatrix}$$

$$86\begin{pmatrix}1&1&-1&-1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&-1\\0&1&0&-1\\0&0&1&-1\end{pmatrix}\begin{pmatrix}1&1&1&0&0&0&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&0&0&0&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&0&0&0\\0&1&\frac{1}{2}&0&1&\frac{1}{2}&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-1&0&-\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&-\frac{1}{2}&\frac{1}{2}&0&-\frac{1}{2}&\frac{1}{2}&0\\0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0&0&1&\frac{1}{2}&-1&0&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&0\end{pmatrix}$$

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$$93\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&1&-1&1\\1&1&-1&-1\end{pmatrix}\begin{pmatrix}1&1&0&0\\0&0&1&0\\0&0&0&1\\0&0&0&0\end{pmatrix}\begin{pmatrix}0&0&0&0\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\end{pmatrix}$$

$$102\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&-1&1&1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&1&0\\0&1&0&0\\0&0&0&1\\0&0&0&0\end{pmatrix}\begin{pmatrix}0&0&0&0\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\end{pmatrix}$$

$$107\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&1&0\\0&0&0&1\\0&0&0&0\end{pmatrix}\begin{pmatrix}\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\0&0&0&0\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\end{pmatrix}$$

$$113\begin{pmatrix}1&1&1&1\\1&1&-1&1\\1&-1&1&1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&1\\0&1&0&0\\0&0&1&0\\0&0&0&0\end{pmatrix}\begin{pmatrix}0&0&0&0\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\end{pmatrix}$$

$$116\begin{pmatrix}1&1&1&1\\1&1&-1&1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&1\\0&0&1&0\\0&0&0&0\end{pmatrix}\begin{pmatrix}\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\0&0&0&0\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\end{pmatrix}$$

$$120\begin{pmatrix}1&1&1&1\\1&1&-1&-1\\1&-1&1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&1\\0&0&0&0\end{pmatrix}\begin{pmatrix}\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\\0&0&0&0\end{pmatrix}$$

$$135\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&-1\\0&0&0&0\end{pmatrix}\begin{pmatrix}\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\\0&0&0&0\end{pmatrix}$$

$$139\begin{pmatrix}1&1&1&-1\\1&1&-1&-1\\1&-1&1&1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&-1\\0&0&1&0\\0&0&0&0\end{pmatrix}\begin{pmatrix}\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\0&0&0&0\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\end{pmatrix}$$

$$142\begin{pmatrix}1&1&1&-1\\1&1&-1&-1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&-1\\0&1&0&0\\0&0&1&0\\0&0&0&0\end{pmatrix}\begin{pmatrix}0&0&0&0\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\end{pmatrix}$$

$$148\begin{pmatrix}1&1&-1&1\\1&1&-1&-1\\1&-1&1&1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&-1&0\\0&0&0&1\\0&0&0&0\end{pmatrix}\begin{pmatrix}\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\0&0&0&0\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\end{pmatrix}$$

$$153\begin{pmatrix}1&1&-1&1\\1&1&-1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&-1&0\\0&1&0&0\\0&0&0&1\\0&0&0&0\end{pmatrix}\begin{pmatrix}0&0&0&0\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\end{pmatrix}$$

$$162\begin{pmatrix}1&-1&1&1\\1&-1&1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&-1&0&0\\0&0&1&0\\0&0&0&1\\0&0&0&0\end{pmatrix}\begin{pmatrix}0&0&0&0\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\0&0&0&0\end{pmatrix}$$

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$$94\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&1&-1&1\\1&-1&1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&-1&-\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&1&\frac{3}{2}&1&1&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}\\1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$97\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&-1&-\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&1&\frac{3}{2}&1&1&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$99\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&1&-1&-1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}2&\frac{3}{2}&\frac{3}{2}&1&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-1&-1&-\frac{1}{2}&\frac{3}{2}&1&1&\frac{1}{2}\\-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}\\-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$100\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&1&-1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}\\2&\frac{3}{2}&\frac{3}{2}&1&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&-1&-\frac{1}{2}&\frac{3}{2}&1&1&\frac{1}{2}\\-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$104\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&-1&1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&-1&-\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&1&\frac{3}{2}&1&1&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$105\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}\\-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}\\2&\frac{3}{2}&\frac{3}{2}&1&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&-1&-\frac{1}{2}&\frac{3}{2}&1&1&\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$109\begin{pmatrix}1&1&1&1\\1&1&-1&1\\1&1&-1&-1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}\\2&\frac{3}{2}&\frac{3}{2}&1&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&-1&-\frac{1}{2}&\frac{3}{2}&1&1&\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$110\begin{pmatrix}1&1&1&1\\1&1&-1&1\\1&1&-1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}2&\frac{3}{2}&\frac{3}{2}&1&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-1&-1&-\frac{1}{2}&\frac{3}{2}&1&1&\frac{1}{2}\\-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$114\begin{pmatrix}1&1&1&1\\1&1&-1&1\\1&-1&1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&-1&-\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&1&\frac{3}{2}&1&1&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}\end{pmatrix}$$

$$115\begin{pmatrix}1&1&1&1\\1&1&-1&1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}\\-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\2&\frac{3}{2}&\frac{3}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&-1&-\frac{1}{2}&\frac{3}{2}&1&1&\frac{1}{2}\end{pmatrix}$$

$$118\begin{pmatrix}1&1&1&1\\1&1&-1&-1\\1&-1&1&1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&1&-2&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&\frac{3}{2}&1&-1&-\frac{1}{2}&1&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$119\begin{pmatrix}1&1&1&1\\1&1&-1&-1\\1&-1&1&1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&1&-2&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&\frac{3}{2}&1&-1&-\frac{1}{2}&1&\frac{1}{2}\end{pmatrix}$$

$$122\begin{pmatrix}1&1&1&1\\1&1&-1&-1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&1&1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&\frac{3}{2}&1&-2&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&\frac{3}{2}&1&-1&1&\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$123\begin{pmatrix}1&1&1&1\\1&1&-1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&1&1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&\frac{3}{2}&1&-2&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&\frac{3}{2}&1&-1&1&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$124\begin{pmatrix}1&1&1&1\\1&-1&1&1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}2&\frac{3}{2}&\frac{3}{2}&1&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-1&-1&-\frac{1}{2}&\frac{3}{2}&1&1&\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}\\-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$127\begin{pmatrix}1&1&1&1\\1&-1&1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&1&1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&\frac{3}{2}&1&-2&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&\frac{3}{2}&1&-1&1&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$128\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&1&-1&-1\\1&-1&1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\2&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&1&-\frac{1}{2}&\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&\frac{3}{2}&1&-\frac{3}{2}&-1&-1&-\frac{1}{2}&1&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$131\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&1&-1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}2&\frac{3}{2}&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&1&\frac{1}{2}&-\frac{1}{2}&-2&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-1&\frac{3}{2}&1&-\frac{3}{2}&-1&-1&-\frac{1}{2}&1&\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$132\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&-1&1&1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&1&1&1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&2&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&\frac{3}{2}&1&-\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&\frac{3}{2}&1&1&-1&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$133\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&-1&1&1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&1&1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-\frac{3}{2}&-1&2&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&1&\frac{3}{2}&1&-\frac{3}{2}&-1&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$136\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-1&2&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&1&\frac{3}{2}&1&-\frac{3}{2}&-1&1&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$137\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&2&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&\frac{3}{2}&1&-2&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&\frac{3}{2}&1&1&\frac{1}{2}&-1&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$140\begin{pmatrix}1&1&1&-1\\1&1&-1&-1\\1&-1&1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}\\-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&1&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&1&1&\frac{1}{2}&-\frac{3}{2}&-1&-1&-\frac{1}{2}\end{pmatrix}$$

$$141\begin{pmatrix}1&1&1&-1\\1&1&-1&-1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\2&\frac{3}{2}&\frac{3}{2}&1&\frac{3}{2}&1&1&\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}\end{pmatrix}$$

$$145\begin{pmatrix}1&1&1&-1\\1&-1&1&1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}2&\frac{3}{2}&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&1&\frac{1}{2}&-\frac{1}{2}&-2&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-1&\frac{3}{2}&1&-\frac{3}{2}&-1&-1&-\frac{1}{2}&1&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$146\begin{pmatrix}1&1&1&-1\\1&-1&1&1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&2&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&\frac{3}{2}&1&-2&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&\frac{3}{2}&1&1&\frac{1}{2}&-1&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$150\begin{pmatrix}1&1&-1&1\\1&1&-1&-1\\1&-1&1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}\\-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}\\-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&2&\frac{3}{2}&\frac{3}{2}&1&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&1&1&\frac{1}{2}&-\frac{3}{2}&-1&-1&-\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$151\begin{pmatrix}1&1&-1&1\\1&1&-1&-1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\2&\frac{3}{2}&\frac{3}{2}&1&\frac{3}{2}&1&1&\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{1}{2}&\frac{1}{2}\\1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$155\begin{pmatrix}1&1&-1&1\\1&-1&1&1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&2&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&\frac{3}{2}&1&-2&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-1&\frac{3}{2}&1&1&\frac{1}{2}&-1&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$156\begin{pmatrix}1&1&-1&1\\1&-1&1&1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}2&\frac{3}{2}&\frac{3}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&1&\frac{1}{2}&-\frac{1}{2}&-2&-\frac{3}{2}&-\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-1&\frac{3}{2}&1&-\frac{3}{2}&-1&-1&-\frac{1}{2}&1&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$158\begin{pmatrix}1&1&-1&-1\\1&-1&1&1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&1&1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\2&\frac{3}{2}&\frac{3}{2}&1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-1&-\frac{3}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&1&1&\frac{1}{2}&-\frac{3}{2}&-1&-1&-\frac{1}{2}\\1&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$161\begin{pmatrix}1&1&-1&-1\\1&-1&1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}2&\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{3}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-2&-\frac{3}{2}&-\frac{3}{2}&-\frac{3}{2}&-1&\frac{3}{2}&1&-\frac{3}{2}&-1&1&-1&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&1&1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-1&-1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&1&-1&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

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$$95\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&1&-1&1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-\frac{1}{2}&\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}\\1&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$96\begin{pmatrix}1&1&1&1\\1&1&1&-1\\1&1&-1&1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-\frac{1}{2}&-1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}\\1&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$98\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\\ 1 & 1 & -1 & -1\\ 1 & -1 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\left(\begin{array}{cccccccccccccccc}\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -1 & \frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & 1 & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{array}\right)$$

$$101\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\\ 1 & 1 & -1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\left(\begin{array}{cccccccccccccccc}\frac{1}{2} & 1 & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & 1 & -\frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{array}\right)$$

$$103\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\\ 1 & -1 & 1 & 1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\left(\begin{array}{cccccccccccccccc}-\frac{1}{2} & -1 & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 1 & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{array}\right)$$

$$106\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & 1 & -1\\ 1 & -1 & 1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\left(\begin{array}{cccccccccccccccc}\frac{1}{2} & 1 & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & 1 & -\frac{1}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\end{array}\right)$$

$$108\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & 1\\ 1 & 1 & -1 & -1\\ 1 & -1 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\left(\begin{array}{cccccccccccccccc}\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -1 & \frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & 1 & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2}\end{array}\right)$$

$$111\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & 1\\ 1 & 1 & -1 & -1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\left(\begin{array}{cccccccccccccccc}\frac{1}{2} & 1 & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & 1 & -\frac{1}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2}\end{array}\right)$$

$$112\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & 1\\ 1 & -1 & 1 & 1\\ 1 & -1 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\left(\begin{array}{cccccccccccccccc}-\frac{1}{2} & -1 & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 1 & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2}\end{array}\right)$$

$$117\begin{pmatrix}1&1&1&1\\1&1&-1&1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$125\begin{pmatrix}1&1&1&1\\1&-1&1&1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$126\begin{pmatrix}1&1&1&1\\1&-1&1&1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&1&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$129\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&1&-1&-1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&-1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$130\begin{pmatrix}1&1&1&-1\\1&1&-1&1\\1&1&-1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$138\begin{pmatrix}1&1&1&-1\\1&1&-1&-1\\1&-1&1&1\\1&-1&1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$143\begin{pmatrix}1&1&1&-1\\1&1&-1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$144\begin{pmatrix}1&1&1&-1\\1&-1&1&1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$147\begin{pmatrix}1&1&1&-1\\1&-1&1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$149\begin{pmatrix}1&1&-1&1\\1&1&-1&-1\\1&-1&1&1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$152\begin{pmatrix}1&1&-1&1\\1&1&-1&-1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$154\begin{pmatrix}1&1&-1&1\\1&-1&1&1\\1&-1&1&-1\\1&-1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

$$157\begin{pmatrix}1&1&-1&1\\1&-1&1&-1\\1&-1&-1&1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\1&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}\end{pmatrix}$$

$$159\begin{pmatrix}1&1&-1&-1\\1&-1&1&1\\1&-1&1&-1\\1&-1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0&0\\0&1&0&0\\0&0&1&0\\0&0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&1&1&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&1&-\frac{1}{2}&\frac{1}{2}\\1&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}\end{pmatrix}$$

$$160\begin{pmatrix}1 & 1 & -1 & -1\\ 1 & -1 & 1 & 1\\ 1 & -1 & -1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & 1 & 1 & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2}\\ -\frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & 1 & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$$

Grup 9

$$121\begin{pmatrix}1 & 1 & 1 & 1\\ 1 & 1 & -1 & -1\\ 1 & -1 & 1 & -1\\ 1 & -1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{3}{4} & \frac{1}{2} & \frac{1}{4} & \frac{3}{4} & \frac{1}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{3}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{2} & -\frac{3}{4} & -\frac{1}{4} & -\frac{3}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & \frac{3}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4}\\ \frac{1}{2} & \frac{1}{4} & \frac{1}{2} & \frac{3}{4} & \frac{1}{4} & \frac{3}{4} & -\frac{1}{2} & -\frac{1}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{3}{4} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{2} & -\frac{3}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{3}{4} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4}\\ \frac{1}{2} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{2} & \frac{3}{4} & \frac{1}{2} & \frac{1}{4} & \frac{1}{4} & \frac{3}{4} & \frac{1}{4} & \frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{2} & -\frac{3}{4} & -\frac{3}{4} & -\frac{1}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4}\\ -\frac{1}{2} & -\frac{1}{4} & \frac{1}{2} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{2} & \frac{1}{4} & \frac{1}{2} & \frac{3}{4} & \frac{3}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{3}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{2} & -\frac{3}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{4} & -\frac{3}{4} & -\frac{1}{2} & -\frac{1}{4} & \frac{1}{2} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & -\frac{3}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & -\frac{3}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{3}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4}\end{pmatrix}$$

$$134\begin{pmatrix}1 & 1 & 1 & -1\\ 1 & 1 & -1 & 1\\ 1 & -1 & 1 & 1\\ 1 & -1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0 & 0\\ 0 & 1 & 0 & 0\\ 0 & 0 & 1 & 0\\ 0 & 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{3}{4} & \frac{1}{2} & \frac{1}{4} & \frac{3}{4} & \frac{1}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{3}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{2} & -\frac{3}{4} & -\frac{1}{4} & -\frac{3}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & \frac{3}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4}\\ \frac{1}{2} & \frac{1}{4} & \frac{1}{2} & \frac{3}{4} & \frac{1}{4} & \frac{3}{4} & -\frac{1}{2} & -\frac{1}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{3}{4} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{2} & -\frac{3}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{3}{4} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4}\\ \frac{1}{2} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{2} & \frac{3}{4} & \frac{1}{2} & \frac{1}{4} & \frac{1}{4} & \frac{3}{4} & \frac{1}{4} & \frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{2} & -\frac{3}{4} & -\frac{3}{4} & -\frac{1}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4}\\ \frac{1}{2} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{2} & -\frac{3}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{2} & \frac{3}{4} & \frac{1}{2} & \frac{1}{4} & \frac{1}{4} & \frac{3}{4} & \frac{1}{2} & \frac{1}{4} & -\frac{1}{2} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{3}{4} & -\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{3}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4}\end{pmatrix}$$

EK C: Literatürdeki Bazı Sonuçların Algoritma 3.1 Kullanılarak Elde Edilen Çıktıları

İki İdempotent Matrisin Lineer Bileşiminin İdempotentliği [5]

Grup 1 Lineer bağımlı matrisler ele alınmamıştır.

$1(1 \quad 1)(1 \quad 1)(1 \quad 0)$

Grup 2

$4\begin{pmatrix}1 & 1\\ 1 & 0\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1\\ -1\end{pmatrix}$ Teoremin (*i*) şıkkına karşılık gelmektedir.

$5\begin{pmatrix}1 & 1\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}-1\\ 1\end{pmatrix}$ Teoremin (*iii*) şıkkına karşılık gelmektedir.

$6\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}1\\ 1\end{pmatrix}$ Teoremin (*ii*) şıkkına karşılık gelmektedir.

İki Değişmeli Tripotent Matrisin Lineer Bileşiminin Tripotentliği [15]

Grup 1 Lineer bağımlı matrisler ele alınmamıştır.

$1(1 \quad 1)(1 \quad 1)(1 \quad -1 \quad 0)$

$2(1 \quad -1)(1 \quad -1)(1 \quad -1 \quad 0)$

Grup 2

$5\begin{pmatrix}1 & 1\\ 1 & -1\end{pmatrix}\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$ Teoremin (*g*) şıkkına karşılık gelmektedir.

Grup 3

6 $\begin{pmatrix}1&1\\1&0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}-1&1&1&-1\\2&-2&-1&1\end{pmatrix}$ Teoremin (*a*) ve (*b*) şıklarına karşılık gelmektedir.

7 $\begin{pmatrix}1&1\\0&1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}2&-2&-1&1\\-1&1&1&-1\end{pmatrix}$ Teoremin (*c*) ve (*b*) şıklarına karşılık gelmektedir.

8 $\begin{pmatrix}1&-1\\1&0\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}-1&1&1&-1\\-2&2&1&-1\end{pmatrix}$ Teoremin (*d*) ve (*e*) şıklarına karşılık gelmektedir.

9 $\begin{pmatrix}1&-1\\0&1\end{pmatrix}\begin{pmatrix}1&0\\0&1\end{pmatrix}\begin{pmatrix}2&-2&1&-1\\1&-1&1&-1\end{pmatrix}$ Teoremin (*d*) ve (*f*) şıklarına karşılık gelmektedir.

İkisi Değişmeli Üç İdempotent Matrisin Lineer Bileşiminin İdempotentliği [25]

Grup 1

1 $(1\ \ 1\ \ 1)(1\ \ 1\ \ 1)(1\ \ 0)$ Teorem 1'in (*m*) şıkkına karşılık gelmektedir.

Grup 2

8 $\begin{pmatrix}1&1&1\\1&1&0\end{pmatrix}\begin{pmatrix}1&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}0&1\\1&-1\end{pmatrix}$ Teorem 1'in (*h*) ve (*i*) şıklarına karşılık gelmektedir.

9 $\begin{pmatrix}1&1&1\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}0&1\\1&-1\end{pmatrix}$ Teorem 1'in (*h*) ve (*i*) şıklarına karşılık gelmektedir.

10 $\begin{pmatrix}1&1&1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&1\\0&-1\end{pmatrix}$ Teorem 1'in (*h*) ve (*g*) şıklarına karşılık gelmektedir.

11 $\begin{pmatrix}1&1&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&-1\\0&1\end{pmatrix}$ Teorem 1'in (*h*) ve (*g*) şıklarına karşılık gelmektedir.

12 $\begin{pmatrix}1&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}0&-1\\1&1\end{pmatrix}$ Teorem 1'in (*h*) ve (*g*) şıklarına karşılık gelmektedir.

13 $\begin{pmatrix}1&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}0&-1\\1&1\end{pmatrix}$ Teorem 1'in (*h*) ve (*i*) şıklarına karşılık gelmektedir.

18 $\begin{pmatrix}1&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0\\1&1\end{pmatrix}$ Teorem 1'in (*h*) ve (*j*) şıklarına karşılık gelmektedir.

21 $\begin{pmatrix}1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0\\1&1\end{pmatrix}$ Teorem 1'in (*h*) ve (*j*) şıklarına karşılık gelmektedir.

23 $\begin{pmatrix}1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&1\\1&0\end{pmatrix}$ Teorem 1'in (*h*) ve (*j*) şıklarına karşılık gelmektedir.

Grup 3

14 $\begin{pmatrix}1&1&0\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&-1\end{pmatrix}\begin{pmatrix}1&0&1&0\\0&1&-1&0\end{pmatrix}$

16 $\begin{pmatrix}1&1&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&-1\\0&1&1\end{pmatrix}\begin{pmatrix}0&1&-1&0\\1&0&1&0\end{pmatrix}$

20 $\begin{pmatrix}1&0&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&1&0&0\\1&0&1&0\end{pmatrix}$ Teorem 1'in (*k*) şıkkına karşılık gelmektedir.

Grup 4

29 $\begin{pmatrix}1&1&1\\1&1&0\\1&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&2\\1&-1\\1&-1\end{pmatrix}$ Teorem 1'in (*f*) şıkkına karşılık gelmektedir.

31 $\begin{pmatrix}1&1&1\\1&1&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&-1\\-1&2\\1&-1\end{pmatrix}$ Teorem 1'in (*f*) şıkkına karşılık gelmektedir.

35 $\begin{pmatrix}1&1&1\\1&0&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&-1\\1&-1\\-1&2\end{pmatrix}$ Teorem 1'in (*f*) şıkkına karşılık gelmektedir.

39 $\begin{pmatrix}1&1&1\\1&0&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1\\1&1\\-1&-2\end{pmatrix}$ Teorem 1’in (*e*) şıkkına karşılık gelmektedir.

40 $\begin{pmatrix}1&1&1\\1&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1\\-1&-2\\1&1\end{pmatrix}$ Teorem 1’in (*e*) şıkkına karşılık gelmektedir.

43 $\begin{pmatrix}1&1&1\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-2\\1&1\\1&1\end{pmatrix}$ Teorem 1’in (*e*) şıkkına karşılık gelmektedir.

46 $\begin{pmatrix}1&1&0\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1\\1&1\\2&1\end{pmatrix}$ Teorem 1’in (*b*) şıkkına karşılık gelmektedir.

47 $\begin{pmatrix}1&1&0\\1&0&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1&-1\\2&1\\1&1\end{pmatrix}$ Teorem 1’in (*b*) şıkkına karşılık gelmektedir.

48 $\begin{pmatrix}1&1&0\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1\\-1&-1\\2&1\end{pmatrix}$ Teorem 1’in (*b*) şıkkına karşılık gelmektedir.

52 $\begin{pmatrix}1&1&0\\0&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1\\-1&-1\\1&1\end{pmatrix}$ Teorem 1’in (*b*) şıkkına karşılık gelmektedir.

54 $\begin{pmatrix}1&0&1\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1\\2&1\\-1&-1\end{pmatrix}$ Teorem 1’in (*b*) şıkkına karşılık gelmektedir.

57 $\begin{pmatrix}1&0&1\\0&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1\\1&1\\-1&-1\end{pmatrix}$ Teorem 1’in (*b*) şıkkına karşılık gelmektedir.

Grup 5

30 $\begin{pmatrix}1&1&1\\1&1&0\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1\\-1\\1\end{pmatrix}$ Teorem 1’in (*a*) şıkkına karşılık gelmektedir.

32 $\begin{pmatrix}1&1&1\\1&1&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1\\1\\1\end{pmatrix}$ Teorem 1’in (*a*) şıkkına karşılık gelmektedir.

34 $\begin{pmatrix}1&1&1\\1&0&1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1\\1\\-1\end{pmatrix}$ Teorem 1’in (*a*) şıkkına karşılık gelmektedir.

37 $\begin{pmatrix}1&1&1\\1&0&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1\\1\\1\end{pmatrix}$ Teorem 1’in (*a*) şıkkına karşılık gelmektedir.

41 $\begin{pmatrix}1&1&1\\0&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1\\1\\-1\end{pmatrix}$ Teorem 1’in (*a*) şıkkına karşılık gelmektedir.

42 $\begin{pmatrix}1&1&1\\0&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1\\-1\\1\end{pmatrix}$ Teorem 1’in (*a*) şıkkına karşılık gelmektedir.

44 $\begin{pmatrix}1&1&0\\1&0&1\\1&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1\\-1\\-1\end{pmatrix}$ Teorem 1’in (*d*) şıkkına karşılık gelmektedir.

50 $\begin{pmatrix}1&1&0\\1&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1\\-1\\1\end{pmatrix}$ Teorem 1’in (*a*) şıkkına karşılık gelmektedir.

51 $\begin{pmatrix}1&1&0\\0&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1\\1\\-1\end{pmatrix}$ Teorem 1’in (*d*) şıkkına karşılık gelmektedir.

53 $\begin{pmatrix}1&1&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1\\1\\1\end{pmatrix}$ Teorem 1’in (*a*) şıkkına karşılık gelmektedir.

$55\begin{pmatrix}1&0&1\\1&0&0\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1\\1\\-1\end{pmatrix}$ Teorem 1'in (*a*) şıkkına karşılık gelmektedir.

$58\begin{pmatrix}1&0&1\\0&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1\\-1\\1\end{pmatrix}$ Teorem 1'in (*d*) şıkkına karşılık gelmektedir.

$59\begin{pmatrix}1&0&1\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-1\\1\\1\end{pmatrix}$ Teorem 1'in (*a*) şıkkına karşılık gelmektedir.

$60\begin{pmatrix}1&0&0\\0&1&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1\\1\\-1\end{pmatrix}$ Teorem 1'in (*a*) şıkkına karşılık gelmektedir.

$61\begin{pmatrix}1&0&0\\0&1&1\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1\\-1\\1\end{pmatrix}$ Teorem 1'in (*a*) şıkkına karşılık gelmektedir.

$62\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1\\1\\1\end{pmatrix}$ Teorem 1'in (*l*) şıkkına karşılık gelmektedir.

Grup 6

$33\begin{pmatrix}1&1&1\\1&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&0\\0&0&1\\0&0&0\end{pmatrix}\begin{pmatrix}0\\1\\0\end{pmatrix}$

$36\begin{pmatrix}1&1&1\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\\0&0&0\end{pmatrix}\begin{pmatrix}0\\1\\0\end{pmatrix}$

$38\begin{pmatrix}1&1&1\\1&0&0\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&1\\0&0&0\end{pmatrix}\begin{pmatrix}1\\0\\0\end{pmatrix}$

Grup 7

$45\begin{pmatrix}1&1&0\\1&0&1\\0&1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$ Teorem 1'in (*c*) şıkkına karşılık gelmektedir.

Karşılıklı Değişmeli İki İnvolutif Bir Tripotent Matrisin Lineer Bileşiminin Tripotentliği [27]

Grup 1

$1(1\quad 1\quad 1)(1\quad 1\quad 1)(1\quad -1\quad 0)$ Teorem2.2'nin (*e*) şıkkına karşılık gelmektedir.

$2(1\quad 1\quad -1)(1\quad 1\quad -1)(1\quad -1\quad 0)$ Teorem2.2'nin (*f*) şıkkına karşılık gelmektedir.

$4(1\quad -1\quad 1)(1\quad -1\quad 1)(1\quad -1\quad 0)$ Teorem2.2'nin (*f*) şıkkına karşılık gelmektedir.

$5(1\quad -1\quad -1)(1\quad -1\quad -1)(1\quad -1\quad 0)$ Teorem2.2'nin (*f*) şıkkına karşılık gelmektedir.

Grup 2

$7\begin{pmatrix}1&1&1\\1&1&-1\end{pmatrix}\begin{pmatrix}1&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}0&\frac{1}{2}&0&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\1&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$ Teorem2.2'nin (*a*) şıkkına karşılık gelmektedir.

$9\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$ Teorem2.2'nin (*a*) şıkkına karşılık gelmektedir.

$10\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 0 & \frac{1}{2} & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$ Teorem2.2'nin (*a*) şıkkına karşılık gelmektedir.

$13\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & -1\end{pmatrix}\begin{pmatrix}1 & \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 0 & \frac{1}{2} & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$ Teorem2.2'nin (*d*) şıkkına karşılık gelmektedir.

$14\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -1\\ 0 & 1 & 0\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$ Teorem2.2'nin (*d*) şıkkına karşılık gelmektedir.

$19\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}0 & \frac{1}{2} & 0 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$ Teorem2.2'nin (*d*) şıkkına karşılık gelmektedir.

Grup 3

$8\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ 2 & 1 & -2 & -1 & -1 & 1\end{pmatrix}$ Teorem2.3'ün (n') şıkkına karşılık gelmektedir.

$12\begin{pmatrix}1 & 1 & -1\\ 1 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ -2 & -1 & 2 & 1 & 1 & -1\end{pmatrix}$ Teorem2.3'ün (o') şıkkına karşılık gelmektedir.

$20\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ 2 & 1 & -2 & -1 & -1 & 1\end{pmatrix}$ Teorem2.3'ün (m') şıkkına karşılık gelmektedir.

$21\begin{pmatrix}1 & -1 & -1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & 0 & 1 & 0 & 1 & -1\\ -2 & -1 & 2 & 1 & 1 & -1\end{pmatrix}$ Teorem2.3'ün (m') şıkkına karşılık gelmektedir.

Grup 4

$11\begin{pmatrix}1 & 1 & 1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2}\\ 0 & 1 & \frac{1}{2}\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$ Teorem2.3'ün (d') şıkkına karşılık gelmektedir.

$15\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & -\frac{1}{2}\\ 0 & 1 & -\frac{1}{2}\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$ Teorem2.3'ün (e') şıkkına karşılık gelmektedir.

$16\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2}\\ 0 & 1 & -\frac{1}{2}\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$ Teorem2.3'ün (a') şıkkına karşılık gelmektedir.

$17\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & -\frac{1}{2}\\ 0 & 1 & \frac{1}{2}\end{pmatrix}\begin{pmatrix}1 & 0 & \frac{1}{2} & 0 & -1 & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & 0\\ 0 & 1 & \frac{1}{2} & -1 & 0 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & 0\end{pmatrix}$ Teorem2.3'ün (a') şıkkına karşılık gelmektedir.

Grup 5

$22\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & -1\\ 1 & 1 & 0\end{pmatrix}\begin{pmatrix}1 & 1 & 0\\ 0 & 0 & 1\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & 0\\ 1 & -1\\ 0 & 0\end{pmatrix}$

$41\begin{pmatrix}1 & -1 & 1\\ 1 & -1 & -1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & -1 & 0\\ 0 & 0 & 1\\ 0 & 0 & 0\end{pmatrix}\begin{pmatrix}0 & 0\\ 1 & -1\\ 0 & 0\end{pmatrix}$

Grup 6

$23\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & -1\\ 1 & -1 & 1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-1 & -\frac{1}{2} & -\frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{2} & 1 & -1\\ 1 & \frac{1}{2} & 1 & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\end{pmatrix}$ Teorem2.2'nin (*b*) şıkkına karşılık gelmektedir.

$$24\begin{pmatrix}1&1&1\\1&1&-1\\1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&1&-1\\1&1&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$ Teorem2.2’nin (b) şıkkına karşılık gelmektedir.

$$29\begin{pmatrix}1&1&1\\1&-1&1\\1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\-1&-\frac{1}{2}&-\frac{1}{2}&1&\frac{1}{2}&\frac{1}{2}&1&-1\end{pmatrix}$$ Teorem2.2’nin (b) şıkkına karşılık gelmektedir.

$$35\begin{pmatrix}1&1&-1\\1&-1&1\\1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&-1&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\1&\frac{1}{2}&1&-1&-\frac{1}{2}&-1&\frac{1}{2}&-\frac{1}{2}\\1&\frac{1}{2}&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&1&-1\end{pmatrix}$$ Teorem2.2’nin (c) şıkkına karşılık gelmektedir.

Grup 7

$$25\begin{pmatrix}1&1&1\\1&1&-1\\1&-1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&-\frac{1}{2}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&\frac{3}{4}&-\frac{1}{4}&\frac{1}{4}&\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}\\-\frac{1}{2}&\frac{1}{2}&-\frac{1}{4}&\frac{3}{4}&\frac{1}{4}&-\frac{1}{2}&\frac{1}{2}&-\frac{3}{4}&\frac{1}{4}&-\frac{1}{4}&-\frac{1}{4}&\frac{3}{4}&\frac{1}{4}&-\frac{3}{4}&\frac{1}{4}&-\frac{1}{4}\\1&1&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

Teorem2.3’ün (l') şıkkına karşılık gelmektedir.

$$38\begin{pmatrix}1&1&0\\1&-1&1\\1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}\frac{1}{2}&\frac{3}{4}&\frac{1}{2}&\frac{1}{4}&\frac{3}{4}&\frac{1}{4}&-\frac{1}{2}&-\frac{1}{4}&-\frac{1}{2}&-\frac{3}{4}&-\frac{1}{4}&-\frac{3}{4}&\frac{1}{4}&-\frac{1}{4}&\frac{1}{4}&-\frac{1}{4}\\\frac{1}{2}&\frac{1}{4}&\frac{1}{2}&\frac{3}{4}&\frac{1}{4}&\frac{3}{4}&-\frac{1}{2}&-\frac{3}{4}&-\frac{1}{2}&-\frac{1}{4}&-\frac{3}{4}&-\frac{1}{4}&-\frac{1}{4}&\frac{1}{4}&-\frac{1}{4}&\frac{1}{4}\\1&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\end{pmatrix}$$

Teorem2.3’ün (c') şıkkına karşılık gelmektedir.

Grup 8

$$26\begin{pmatrix}1&1&1\\1&1&0\\1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}-2&-\frac{3}{2}&-1&-\frac{1}{2}&2&\frac{3}{2}&1&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{3}{2}\\1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}\\2&2&1&1&-2&-2&-1&-1&-1&-1&1&1\end{pmatrix}$$ Teorem2.3’ün (j') şıkkına karşılık gelmektedir.

$$27\begin{pmatrix}1&1&1\\1&1&0\\1&-1&-1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-2&-\frac{3}{2}&-1&-\frac{1}{2}&2&\frac{3}{2}&1&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}\\2&2&1&1&-2&-2&-1&-1&-1&-1&1&1\end{pmatrix}$$ Teorem2.3’ün (j') şıkkına karşılık gelmektedir.

$$30\begin{pmatrix}1&1&1\\1&-1&1\\1&-1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}2&1&\frac{3}{2}&-\frac{1}{2}&-2&-1&\frac{1}{2}&-\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}&\frac{3}{2}&\frac{1}{2}\\1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}\\-2&-1&-1&1&2&1&-1&1&2&1&-2&-1\end{pmatrix}$$ Teorem2.3’ün (f') şıkkına karşılık gelmektedir.

$$31\begin{pmatrix}1&1&1\\1&-1&-1\\1&-1&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&1&\frac{1}{2}&\frac{1}{2}&-1&-1&-\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&-\frac{1}{2}\\2&1&-\frac{1}{2}&\frac{3}{2}&-2&-1&-\frac{3}{2}&\frac{1}{2}&\frac{3}{2}&\frac{1}{2}&-\frac{3}{2}&-\frac{1}{2}\\-2&-1&1&-1&2&1&1&-1&-2&-1&2&1\end{pmatrix}$$ Teorem2.3’ün (f') şıkkına karşılık gelmektedir.

$$32\begin{pmatrix}1&1&-1\\1&1&0\\1&-1&1\end{pmatrix}\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}\begin{pmatrix}1&\frac{1}{2}&1&\frac{1}{2}&-1&-\frac{1}{2}&-1&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}&\frac{1}{2}&-\frac{1}{2}\\-2&-\frac{3}{2}&-1&-\frac{1}{2}&2&\frac{3}{2}&1&\frac{1}{2}&\frac{1}{2}&\frac{3}{2}&-\frac{3}{2}&-\frac{1}{2}\\-2&-2&-1&-1&2&2&1&1&1&1&-1&-1\end{pmatrix}$$ Teorem2.3’ün (k') şıkkına karşılık gelmektedir.

$33\begin{pmatrix}1 & 1 & -1\\ 1 & 1 & 0\\ 1 & -1 & -1\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-2 & -\frac{3}{2} & -1 & -\frac{1}{2} & 2 & \frac{3}{2} & 1 & \frac{1}{2} & \frac{3}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{3}{2}\\ 1 & \frac{1}{2} & 1 & \frac{1}{2} & -1 & -\frac{1}{2} & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ -2 & -2 & -1 & -1 & 2 & 2 & 1 & 1 & 1 & 1 & -1 & -1\end{pmatrix}$ Teorem2.3'ün (k') şıkkına karşılık gelmektedir.

$36\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & 1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2}\\ 2 & 1 & -\frac{1}{2} & \frac{3}{2} & -2 & -1 & -\frac{3}{2} & \frac{1}{2} & \frac{3}{2} & \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2}\\ 2 & 1 & -1 & 1 & -2 & -1 & -1 & 1 & 2 & 1 & -2 & -1\end{pmatrix}$ Teorem2.3'ün (g') şıkkına karşılık gelmektedir.

$37\begin{pmatrix}1 & 1 & -1\\ 1 & -1 & -1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}2 & 1 & \frac{3}{2} & -\frac{1}{2} & -2 & -1 & \frac{1}{2} & -\frac{3}{2} & -\frac{3}{2} & -\frac{1}{2} & \frac{3}{2} & \frac{1}{2}\\ 1 & 1 & \frac{1}{2} & \frac{1}{2} & -1 & -1 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2}\\ 2 & 1 & 1 & -1 & -2 & -1 & 1 & -1 & -2 & -1 & 2 & 1\end{pmatrix}$ Teorem2.3'ün (g') şıkkına karşılık gelmektedir.

Grup 9

$28\begin{pmatrix}1 & 1 & 1\\ 1 & 1 & 0\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ 2 & 1 & 1 & -2 & -1 & -1 & -1 & 1\end{pmatrix}$ Teorem2.3'ün (h') şıkkına karşılık gelmektedir.

$34\begin{pmatrix}1 & 1 & -1\\ 1 & 1 & 0\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}-\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ -2 & -1 & -1 & 2 & 1 & 1 & 1 & -1\end{pmatrix}$ Teorem2.3'ün (i') şıkkına karşılık gelmektedir.

$39\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & 1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ 1 & -1 & 1 & -1 & 2 & -2 & -1 & 1\end{pmatrix}$ Teorem2.3'ün (b') şıkkına karşılık gelmektedir.

$40\begin{pmatrix}1 & 1 & 0\\ 1 & -1 & -1\\ 1 & -1 & 0\end{pmatrix}\begin{pmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{pmatrix}\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} & -\frac{1}{2}\\ \frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ -1 & 1 & -1 & 1 & -2 & 2 & 1 & -1\end{pmatrix}$ Teorem2.3'ün (b') şıkkına karşılık gelmektedir.

ÖZGEÇMİŞ

Emre KİŞİ, 07.05.1985 tarihinde İzmir'de doğdu. Lise eğitimini 2004 yılında Aydın Yesevi Koleji'nde tamamladı. 2005 yılında Uludağ Üniversitesi Fen Edebiyat Fakültesi Matematik Bölümü'nde lisans eğitimine başladı ve 2009 yılında lisans eğitimini tamamladı. 2010 yılında Sakarya Üniversitesi Fen Bilimleri Enstitüsü Matematik EABD'da yüksek lisans programına kaydoldu ve 2012 yılında yüksek lisans eğitimini tamamladı. 2010 yılında Sakarya Üniversitesi Fen Edebiyat Fakültesi Matematik Bölümü'nde araştırma görevlisi olarak çalışmaya başladı. 2012 yılında İlim KİŞİ ile evlendi.