

Uniquely Factorable Constellations

1 4-UFC

$$N = 2 \quad D(\mathbb{U}_2) = \frac{1}{\sqrt{2}}$$

$$\mathbb{U}_2 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ j \end{pmatrix}, \begin{pmatrix} 1 \\ -j \end{pmatrix}$$

2 8-UFC

$$N = 3 \quad D(\mathbb{U}_3) = \frac{1}{\sqrt{2}\sqrt{3}}$$

$$\mathbb{U}_3 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ j \end{pmatrix}, \begin{pmatrix} 1 \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 1+j \end{pmatrix}, \begin{pmatrix} 1 \\ -1-j \end{pmatrix}, \begin{pmatrix} 1 \\ 1-j \end{pmatrix}, \begin{pmatrix} 1 \\ -1+j \end{pmatrix}$$

3 16-UFC

$$N = 5 \quad D(\mathbb{U}_4) = \frac{1}{\sqrt{2}\sqrt{5}}$$

$$\mathbb{U}_4 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ j \end{pmatrix}, \begin{pmatrix} 1 \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 1+j \end{pmatrix}, \begin{pmatrix} 1 \\ -1-j \end{pmatrix}, \begin{pmatrix} 1 \\ 1-j \end{pmatrix}, \begin{pmatrix} 1 \\ -1+j \end{pmatrix}$$

$$\begin{pmatrix} 1+j \\ 1 \end{pmatrix}, \begin{pmatrix} 1+j \\ -1 \end{pmatrix}, \begin{pmatrix} 1+j \\ j \end{pmatrix}, \begin{pmatrix} 1+j \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 2 \end{pmatrix}, \begin{pmatrix} 1 \\ -2 \end{pmatrix}, \begin{pmatrix} 1 \\ 2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2j \end{pmatrix}$$

4 32-UFC

$$N = 9 \quad D(\mathbb{U}_5) = \frac{1}{\sqrt{3}\sqrt{7}}$$

$$\mathbb{U}_5 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ j \end{pmatrix}, \begin{pmatrix} 1 \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 1+j \end{pmatrix}, \begin{pmatrix} 1 \\ -1-j \end{pmatrix}, \begin{pmatrix} 1 \\ 1-j \end{pmatrix}, \begin{pmatrix} 1 \\ -1+j \end{pmatrix}$$

$$\begin{pmatrix} 1+j \\ 1 \end{pmatrix}, \begin{pmatrix} 1+j \\ -1 \end{pmatrix}, \begin{pmatrix} 1+j \\ j \end{pmatrix}, \begin{pmatrix} 1+j \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 2 \end{pmatrix}, \begin{pmatrix} 1 \\ -2 \end{pmatrix}, \begin{pmatrix} 1 \\ 2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2j \end{pmatrix}$$

$$\begin{pmatrix} 1+2j \\ 1+j \end{pmatrix}, \begin{pmatrix} 1+2j \\ -1-j \end{pmatrix}, \begin{pmatrix} 1+2j \\ 1-j \end{pmatrix}, \begin{pmatrix} 1+2j \\ -1+j \end{pmatrix}$$

$$\begin{pmatrix} 2+j \\ 1+j \end{pmatrix}, \begin{pmatrix} 2+j \\ -1-j \end{pmatrix}, \begin{pmatrix} 2+j \\ 1-j \end{pmatrix}, \begin{pmatrix} 2+j \\ -1+j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 2+2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2-2j \end{pmatrix}, \begin{pmatrix} 1 \\ 2-2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2+2j \end{pmatrix}$$

$$\begin{pmatrix} 2+2j \\ 1 \end{pmatrix}, \begin{pmatrix} 2+2j \\ -1 \end{pmatrix}, \begin{pmatrix} 2+2j \\ j \end{pmatrix}, \begin{pmatrix} 2+2j \\ -j \end{pmatrix}$$

5 64-UFC

$$N = 9 \quad D(\mathbb{U}_6) = \frac{1}{\sqrt{6}\sqrt{9}}$$

$$\mathbb{U}_6 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ j \end{pmatrix}, \begin{pmatrix} 1 \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 1+j \end{pmatrix}, \begin{pmatrix} 1 \\ -1-j \end{pmatrix}, \begin{pmatrix} 1 \\ 1-j \end{pmatrix}, \begin{pmatrix} 1 \\ -1+j \end{pmatrix} \\ \begin{pmatrix} 1+j \\ 1 \end{pmatrix}, \begin{pmatrix} 1+j \\ -1 \end{pmatrix}, \begin{pmatrix} 1+j \\ j \end{pmatrix}, \begin{pmatrix} 1+j \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 2 \end{pmatrix}, \begin{pmatrix} 1 \\ -2 \end{pmatrix}, \begin{pmatrix} 1 \\ 2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 1+2j \end{pmatrix}, \begin{pmatrix} 1 \\ -1-2j \end{pmatrix}, \begin{pmatrix} 1 \\ 1-2j \end{pmatrix}, \begin{pmatrix} 1 \\ -1+2j \end{pmatrix} \\ \begin{pmatrix} 1 \\ 2+j \end{pmatrix}, \begin{pmatrix} 1 \\ -2-j \end{pmatrix}, \begin{pmatrix} 1 \\ 2-j \end{pmatrix}, \begin{pmatrix} 1 \\ -2+j \end{pmatrix} \\ \begin{pmatrix} 1+2j \\ 1 \end{pmatrix}, \begin{pmatrix} 1+2j \\ -1 \end{pmatrix}, \begin{pmatrix} 1+2j \\ j \end{pmatrix}, \begin{pmatrix} 1+2j \\ -j \end{pmatrix} \\ \begin{pmatrix} 2+j \\ 1 \end{pmatrix}, \begin{pmatrix} 2+j \\ -1 \end{pmatrix}, \begin{pmatrix} 2+j \\ j \end{pmatrix}, \begin{pmatrix} 2+j \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1+j \\ 1+2j \end{pmatrix}, \begin{pmatrix} 1+j \\ -1-2j \end{pmatrix}, \begin{pmatrix} 1+j \\ 1-2j \end{pmatrix}, \begin{pmatrix} 1+j \\ -1+2j \end{pmatrix} \\ \begin{pmatrix} 1+j \\ 2+j \end{pmatrix}, \begin{pmatrix} 1+j \\ -2-j \end{pmatrix}, \begin{pmatrix} 1+j \\ 2-j \end{pmatrix}, \begin{pmatrix} 1+j \\ -2+j \end{pmatrix} \\ \begin{pmatrix} 1+2j \\ 1+j \end{pmatrix}, \begin{pmatrix} 1+2j \\ -1-j \end{pmatrix}, \begin{pmatrix} 1+2j \\ 1-j \end{pmatrix}, \begin{pmatrix} 1+2j \\ -1+j \end{pmatrix} \\ \begin{pmatrix} 2+j \\ 1+j \end{pmatrix}, \begin{pmatrix} 2+j \\ -1-j \end{pmatrix}, \begin{pmatrix} 2+j \\ 1-j \end{pmatrix}, \begin{pmatrix} 2+j \\ -1+j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 2+2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2-2j \end{pmatrix}, \begin{pmatrix} 1 \\ 2-2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2+2j \end{pmatrix} \\ \begin{pmatrix} 2 \\ 1+2j \end{pmatrix}, \begin{pmatrix} 2 \\ -1-2j \end{pmatrix}, \begin{pmatrix} 2 \\ 1-2j \end{pmatrix}, \begin{pmatrix} 2 \\ -1+2j \end{pmatrix} \\ \begin{pmatrix} 2 \\ 2+j \end{pmatrix}, \begin{pmatrix} 2 \\ -2-j \end{pmatrix}, \begin{pmatrix} 2 \\ 2-j \end{pmatrix}, \begin{pmatrix} 2 \\ -2+j \end{pmatrix} \\ \begin{pmatrix} 2+2j \\ 1 \end{pmatrix}, \begin{pmatrix} 2+2j \\ -1 \end{pmatrix}, \begin{pmatrix} 2+2j \\ j \end{pmatrix}, \begin{pmatrix} 2+2j \\ -j \end{pmatrix}$$

6 128-UFC

$$N = 13 \quad D(\mathbb{U}_7) = \frac{1}{\sqrt{9}\sqrt{13}}$$

$$\mathbb{U}_7 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ j \end{pmatrix}, \begin{pmatrix} 1 \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 1+j \end{pmatrix}, \begin{pmatrix} 1 \\ -1-j \end{pmatrix}, \begin{pmatrix} 1 \\ 1-j \end{pmatrix}, \begin{pmatrix} 1 \\ -1+j \end{pmatrix} \\ \begin{pmatrix} 1+j \\ 1 \end{pmatrix}, \begin{pmatrix} 1+j \\ -1 \end{pmatrix}, \begin{pmatrix} 1+j \\ j \end{pmatrix}, \begin{pmatrix} 1+j \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 2 \end{pmatrix}, \begin{pmatrix} 1 \\ -2 \end{pmatrix}, \begin{pmatrix} 1 \\ 2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2j \end{pmatrix} \\ \begin{pmatrix} 2 \\ 1 \end{pmatrix}, \begin{pmatrix} 2 \\ -1 \end{pmatrix}, \begin{pmatrix} 2 \\ j \end{pmatrix}, \begin{pmatrix} 2 \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 1+2j \end{pmatrix}, \begin{pmatrix} 1 \\ -1-2j \end{pmatrix}, \begin{pmatrix} 1 \\ 1-2j \end{pmatrix}, \begin{pmatrix} 1 \\ -1+2j \end{pmatrix} \\ \begin{pmatrix} 1 \\ 2+j \end{pmatrix}, \begin{pmatrix} 1 \\ -2-j \end{pmatrix}, \begin{pmatrix} 1 \\ 2-j \end{pmatrix}, \begin{pmatrix} 1 \\ -2+j \end{pmatrix} \\ \begin{pmatrix} 1+2j \\ 1 \end{pmatrix}, \begin{pmatrix} 1+2j \\ -1 \end{pmatrix}, \begin{pmatrix} 1-2j \\ 1 \end{pmatrix}, \begin{pmatrix} 1-2j \\ -1 \end{pmatrix} \\ \begin{pmatrix} 2+j \\ 1 \end{pmatrix}, \begin{pmatrix} 2+j \\ -1 \end{pmatrix}, \begin{pmatrix} 2-j \\ 1 \end{pmatrix}, \begin{pmatrix} 2-j \\ -1 \end{pmatrix}$$

$$\begin{pmatrix} 1+j \\ 1+2j \end{pmatrix}, \begin{pmatrix} 1+j \\ -1-2j \end{pmatrix}, \begin{pmatrix} 1+j \\ 2+j \end{pmatrix}, \begin{pmatrix} 1+j \\ -2-j \end{pmatrix} \\ \begin{pmatrix} 1+j \\ 1-2j \end{pmatrix}, \begin{pmatrix} 1+j \\ -1+2j \end{pmatrix}, \begin{pmatrix} 1+j \\ 2-j \end{pmatrix}, \begin{pmatrix} 1+j \\ -2+j \end{pmatrix} \\ \begin{pmatrix} 1+2j \\ 1+j \end{pmatrix}, \begin{pmatrix} 1+2j \\ -1-j \end{pmatrix}, \begin{pmatrix} 2+j \\ 1+j \end{pmatrix}, \begin{pmatrix} 2+j \\ -1-j \end{pmatrix} \\ \begin{pmatrix} 1-2j \\ 1+j \end{pmatrix}, \begin{pmatrix} 1-2j \\ -1-j \end{pmatrix}, \begin{pmatrix} 2-j \\ 1+j \end{pmatrix}, \begin{pmatrix} 2-j \\ -1-j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 2+2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2-2j \end{pmatrix}, \begin{pmatrix} 1 \\ 2-2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2+2j \end{pmatrix}$$

$$\begin{aligned}
& \binom{2}{1+2j}, \binom{2}{-1-2j}, \binom{2}{1-2j}, \binom{2}{-1+2j} \\
& \binom{2}{2+j}, \binom{2}{-2-j}, \binom{2}{2-j}, \binom{2}{-2+j} \\
& \binom{1-2j}{2}, \binom{1-2j}{-2}, \binom{1-2j}{2j}, \binom{1-2j}{-2j} \\
& \binom{2-j}{2}, \binom{2-j}{-2}, \binom{2-j}{2j}, \binom{2-j}{-2j} \\
& \binom{2-2j}{1}, \binom{2-2j}{-1}, \binom{2-2j}{j}, \binom{2-2j}{-j}
\end{aligned}$$

$$\begin{aligned}
& \binom{1}{3}, \binom{1}{-3}, \binom{1}{3j}, \binom{1}{-3j} \\
& \binom{3}{1}, \binom{3}{-1}, \binom{3}{j}, \binom{3}{-j}
\end{aligned}$$

$$\begin{aligned}
& \binom{1-2j}{2-j}, \binom{1-2j}{-2+j}, \binom{1-2j}{1+2j}, \binom{1-2j}{-1-2j} \\
& \binom{2-j}{1-2j}, \binom{2-j}{-1+2j}, \binom{2-j}{2+j}, \binom{2-j}{-2-j} \\
& \binom{1-2j}{2-j}, \binom{1-2j}{-2+j}, \binom{1-2j}{1+2j}, \binom{1-2j}{-1-2j}
\end{aligned}$$

$$\begin{aligned}
& \binom{1}{1+3j}, \binom{1}{-1-3j}, \binom{1}{1-3j}, \binom{1}{-1+3j} \\
& \binom{1}{3+j}, \binom{1}{-3-j}, \binom{1}{3-j}, \binom{1}{-3+j} \\
& \binom{1-j}{3}, \binom{1-j}{-3}, \binom{1-j}{3j}, \binom{1-j}{-3j} \\
& \binom{3}{1+j}, \binom{3}{-1-j}, \binom{3}{1-j}, \binom{3}{-1+j} \\
& \binom{1-3j}{1}, \binom{1-3j}{-1}, \binom{1-3j}{j}, \binom{1-3j}{-j} \\
& \binom{3-j}{1}, \binom{3-j}{-1}, \binom{3-j}{j}, \binom{3-j}{-j}
\end{aligned}$$

$$\binom{2}{3}, \binom{2}{-3}, \binom{2}{3j}, \binom{2}{-3j}$$

$$\begin{aligned} & \begin{pmatrix} 2-j \\ 2+2j \end{pmatrix}, \begin{pmatrix} 2-j \\ -2-2j \end{pmatrix}, \begin{pmatrix} 2-j \\ 2-2j \end{pmatrix}, \begin{pmatrix} 2-j \\ -2+2j \end{pmatrix} \\ & \begin{pmatrix} 1-2j \\ 2+2j \end{pmatrix}, \begin{pmatrix} 1-2j \\ -2-2j \end{pmatrix}, \begin{pmatrix} 1-2j \\ 2-2j \end{pmatrix}, \begin{pmatrix} 1-2j \\ -2+2j \end{pmatrix} \end{aligned}$$

7 256-UFC

$$N = 18 \quad D(\mathbb{U}_8) = \frac{1}{\sqrt{17}\sqrt{18}}$$

$$\mathbb{U}_7 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ j \end{pmatrix}, \begin{pmatrix} 1 \\ -j \end{pmatrix}$$

$$\begin{aligned} & \begin{pmatrix} 1 \\ 1+j \end{pmatrix}, \begin{pmatrix} 1 \\ -1-j \end{pmatrix}, \begin{pmatrix} 1 \\ 1-j \end{pmatrix}, \begin{pmatrix} 1 \\ -1+j \end{pmatrix} \\ & \begin{pmatrix} 1+j \\ 1 \end{pmatrix}, \begin{pmatrix} 1+j \\ -1 \end{pmatrix}, \begin{pmatrix} 1+j \\ j \end{pmatrix}, \begin{pmatrix} 1+j \\ -j \end{pmatrix} \end{aligned}$$

$$\begin{aligned} & \begin{pmatrix} 1 \\ 2 \end{pmatrix}, \begin{pmatrix} 1 \\ -2 \end{pmatrix}, \begin{pmatrix} 1 \\ 2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2j \end{pmatrix} \\ & \begin{pmatrix} 2 \\ 1 \end{pmatrix}, \begin{pmatrix} 2 \\ -1 \end{pmatrix}, \begin{pmatrix} 2 \\ j \end{pmatrix}, \begin{pmatrix} 2 \\ -j \end{pmatrix} \end{aligned}$$

$$\begin{aligned} & \begin{pmatrix} 1 \\ 1+2j \end{pmatrix}, \begin{pmatrix} 1 \\ -1-2j \end{pmatrix}, \begin{pmatrix} 1 \\ 1-2j \end{pmatrix}, \begin{pmatrix} 1 \\ -1+2j \end{pmatrix} \\ & \begin{pmatrix} 1 \\ 2+j \end{pmatrix}, \begin{pmatrix} 1 \\ -2-j \end{pmatrix}, \begin{pmatrix} 1 \\ 2-j \end{pmatrix}, \begin{pmatrix} 1 \\ -2+j \end{pmatrix} \\ & \begin{pmatrix} 1+2j \\ 1 \end{pmatrix}, \begin{pmatrix} 1+2j \\ -1 \end{pmatrix}, \begin{pmatrix} 1-2j \\ 1 \end{pmatrix}, \begin{pmatrix} 1-2j \\ -1 \end{pmatrix} \\ & \begin{pmatrix} 2+j \\ 1 \end{pmatrix}, \begin{pmatrix} 2+j \\ -1 \end{pmatrix}, \begin{pmatrix} 2-j \\ 1 \end{pmatrix}, \begin{pmatrix} 2-j \\ -1 \end{pmatrix} \end{aligned}$$

$$\begin{aligned} & \begin{pmatrix} 1+j \\ 1+2j \end{pmatrix}, \begin{pmatrix} 1+j \\ -1-2j \end{pmatrix}, \begin{pmatrix} 1+j \\ 2+j \end{pmatrix}, \begin{pmatrix} 1+j \\ -2-j \end{pmatrix} \\ & \begin{pmatrix} 1+j \\ 1-2j \end{pmatrix}, \begin{pmatrix} 1+j \\ -1+2j \end{pmatrix}, \begin{pmatrix} 1+j \\ 2-j \end{pmatrix}, \begin{pmatrix} 1+j \\ -2+j \end{pmatrix} \\ & \begin{pmatrix} 1+2j \\ 1+j \end{pmatrix}, \begin{pmatrix} 1+2j \\ -1-j \end{pmatrix}, \begin{pmatrix} 2+j \\ 1+j \end{pmatrix}, \begin{pmatrix} 2+j \\ -1-j \end{pmatrix} \end{aligned}$$

$$\begin{pmatrix} 1-2j \\ 1+j \end{pmatrix}, \begin{pmatrix} 1-2j \\ -1-j \end{pmatrix}, \begin{pmatrix} 2-j \\ 1+j \end{pmatrix}, \begin{pmatrix} 2-j \\ -1-j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 2+2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2-2j \end{pmatrix}, \begin{pmatrix} 1 \\ 2-2j \end{pmatrix}, \begin{pmatrix} 1 \\ -2+2j \end{pmatrix}$$

$$\begin{pmatrix} 2 \\ 1+2j \end{pmatrix}, \begin{pmatrix} 2 \\ -1-2j \end{pmatrix}, \begin{pmatrix} 2 \\ 1-2j \end{pmatrix}, \begin{pmatrix} 2 \\ -1+2j \end{pmatrix}$$

$$\begin{pmatrix} 2 \\ 2+j \end{pmatrix}, \begin{pmatrix} 2 \\ -2-j \end{pmatrix}, \begin{pmatrix} 2 \\ 2-j \end{pmatrix}, \begin{pmatrix} 2 \\ -2+j \end{pmatrix}$$

$$\begin{pmatrix} 1-2j \\ 2 \end{pmatrix}, \begin{pmatrix} 1-2j \\ -2 \end{pmatrix}, \begin{pmatrix} 1-2j \\ 2j \end{pmatrix}, \begin{pmatrix} 1-2j \\ -2j \end{pmatrix}$$

$$\begin{pmatrix} 2-j \\ 2 \end{pmatrix}, \begin{pmatrix} 2-j \\ -2 \end{pmatrix}, \begin{pmatrix} 2-j \\ 2j \end{pmatrix}, \begin{pmatrix} 2-j \\ -2j \end{pmatrix}$$

$$\begin{pmatrix} 2-2j \\ 1 \end{pmatrix}, \begin{pmatrix} 2-2j \\ -1 \end{pmatrix}, \begin{pmatrix} 2-2j \\ j \end{pmatrix}, \begin{pmatrix} 2-2j \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 3 \end{pmatrix}, \begin{pmatrix} 1 \\ -3 \end{pmatrix}, \begin{pmatrix} 1 \\ 3j \end{pmatrix}, \begin{pmatrix} 1 \\ -3j \end{pmatrix}$$

$$\begin{pmatrix} 3 \\ 1 \end{pmatrix}, \begin{pmatrix} 3 \\ -1 \end{pmatrix}, \begin{pmatrix} 3 \\ j \end{pmatrix}, \begin{pmatrix} 3 \\ -j \end{pmatrix}$$

$$\begin{pmatrix} 1-2j \\ 2-j \end{pmatrix}, \begin{pmatrix} 1-2j \\ -2+j \end{pmatrix}, \begin{pmatrix} 1-2j \\ 1+2j \end{pmatrix}, \begin{pmatrix} 1-2j \\ -1-2j \end{pmatrix}$$

$$\begin{pmatrix} 2-j \\ 1-2j \end{pmatrix}, \begin{pmatrix} 2-j \\ -1+2j \end{pmatrix}, \begin{pmatrix} 2-j \\ 2+j \end{pmatrix}, \begin{pmatrix} 2-j \\ -2-j \end{pmatrix}$$

$$\begin{pmatrix} 1-2j \\ 2-j \end{pmatrix}, \begin{pmatrix} 1-2j \\ -2+j \end{pmatrix}, \begin{pmatrix} 1-2j \\ 1+2j \end{pmatrix}, \begin{pmatrix} 1-2j \\ -1-2j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 1+3j \end{pmatrix}, \begin{pmatrix} 1 \\ -1-3j \end{pmatrix}, \begin{pmatrix} 1 \\ 1-3j \end{pmatrix}, \begin{pmatrix} 1 \\ -1+3j \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 3+j \end{pmatrix}, \begin{pmatrix} 1 \\ -3-j \end{pmatrix}, \begin{pmatrix} 1 \\ 3-j \end{pmatrix}, \begin{pmatrix} 1 \\ -3+j \end{pmatrix}$$

$$\begin{pmatrix} 1-j \\ 3 \end{pmatrix}, \begin{pmatrix} 1-j \\ -3 \end{pmatrix}, \begin{pmatrix} 1-j \\ 3j \end{pmatrix}, \begin{pmatrix} 1-j \\ -3j \end{pmatrix}$$

$$\begin{pmatrix} 3 \\ 1+j \end{pmatrix}, \begin{pmatrix} 3 \\ -1-j \end{pmatrix}, \begin{pmatrix} 3 \\ 1-j \end{pmatrix}, \begin{pmatrix} 3 \\ -1+j \end{pmatrix}$$

$$\begin{pmatrix} 1-3j \\ 1 \end{pmatrix}, \begin{pmatrix} 1-3j \\ -1 \end{pmatrix}, \begin{pmatrix} 1-3j \\ j \end{pmatrix}, \begin{pmatrix} 1-3j \\ -j \end{pmatrix}$$

$$\binom{3-j}{1}, \binom{3-j}{-1}, \binom{3-j}{j}, \binom{3-j}{-j}$$

$$\binom{2}{3}, \binom{2}{-3}, \binom{2}{3j}, \binom{2}{-3j}$$

$$\binom{3}{2}, \binom{3}{-2}, \binom{3}{2j}, \binom{3}{-2j}$$

$$\binom{2-j}{2+2j}, \binom{2-j}{-2-2j}, \binom{2-j}{2-2j}, \binom{2-j}{-2+2j}$$

$$\binom{1-2j}{2+2j}, \binom{1-2j}{-2-2j}, \binom{1-2j}{2-2j}, \binom{1-2j}{-2+2j}$$

$$\binom{2-2j}{1+2j}, \binom{2-2j}{1-2j}, \binom{2-2j}{-1+2j}, \binom{2-2j}{-1-2j}$$

$$\binom{2-2j}{2+j}, \binom{2-2j}{2-j}, \binom{2-2j}{-2+j}, \binom{2-2j}{-2-j}$$

$$\binom{1}{2+3j}, \binom{1}{2-3j}, \binom{1}{-2+3j}, \binom{1}{-2-3j}$$

$$\binom{1}{3+2j}, \binom{1}{3-2j}, \binom{1}{-3+2j}, \binom{1}{-3-2j}$$

$$\binom{3}{1+2j}, \binom{3}{1-2j}, \binom{3}{-1+2j}, \binom{3}{-1-2j}$$

$$\binom{3}{2+j}, \binom{3}{2-j}, \binom{3}{-2+j}, \binom{3}{-2-j}$$

$$\binom{1+2j}{3}, \binom{1+2j}{-3}, \binom{1+2j}{3j}, \binom{1+2j}{-3j}$$

$$\binom{2+j}{3}, \binom{2+j}{-3}, \binom{2+j}{3j}, \binom{2+j}{-3j}$$

$$\binom{2+3j}{1}, \binom{2+3j}{-1}, \binom{2+3j}{j}, \binom{2+3j}{-j}$$

$$\binom{3+2j}{1}, \binom{3+2j}{-1}, \binom{3+2j}{j}, \binom{3+2j}{-j}$$

$$\binom{1+j}{2+3j}, \binom{1+j}{2-3j}, \binom{1+j}{-2+3j}, \binom{1+j}{-2-3j}$$

$$\binom{1+j}{3+2j}, \binom{1+j}{3-2j}, \binom{1+j}{-3+2j}, \binom{1+j}{-3-2j}$$

$$\begin{aligned}
& \binom{1-2j}{1-3j}, \binom{1-2j}{3+j}, \binom{1-2j}{-1+3j}, \binom{1-2j}{-3-j} \\
& \binom{1-3j}{1-2j}, \binom{1-3j}{2+j}, \binom{1-3j}{-1+2j}, \binom{1-3j}{-2-j} \\
& \binom{2-j}{3-j}, \binom{2-j}{1+3j}, \binom{2-j}{-3+j}, \binom{2-j}{-1-3j} \\
& \binom{3-j}{2-j}, \binom{2-j}{1+2j}, \binom{3-j}{-2+j}, \binom{3-j}{-1-2j} \\
& \binom{2-3j}{1+j}, \binom{2-3j}{1-j}, \binom{2-3j}{-1+j}, \binom{2-3j}{-1-j} \\
& \binom{3-2j}{1+j}, \binom{3-2j}{1-j}, \binom{3-2j}{-1+j}, \binom{3-2j}{-1-j}
\end{aligned}$$

$$\begin{aligned}
& \binom{1}{4}, \binom{1}{-4}, \binom{1}{4j}, \binom{1}{-4j} \\
& \binom{4}{1}, \binom{4}{-1}, \binom{4}{j}, \binom{4}{-j}
\end{aligned}$$

$$\begin{aligned}
& \binom{2}{2+3j}, \binom{2}{2-3j}, \binom{2}{-2+3j}, \binom{2}{-2-3j} \\
& \binom{2}{3+2j}, \binom{2}{3-2j}, \binom{2}{-3+2j}, \binom{2}{-3-2j} \\
& \binom{3}{2+2j}, \binom{3}{2-2j}, \binom{3}{-2+2j}, \binom{3}{-2-2j} \\
& \binom{2+2j}{3}, \binom{2+2j}{-3}, \binom{2+2j}{3j}, \binom{2+2j}{-3j} \\
& \binom{2+3j}{2}, \binom{2+3j}{-2}, \binom{2+3j}{2j}, \binom{2+3j}{-2j} \\
& \binom{3+2j}{2}, \binom{3+2j}{-2}, \binom{3+2j}{2j}, \binom{3+2j}{-2j}
\end{aligned}$$

$$\begin{aligned}
& \binom{1}{1+4j}, \binom{1}{1-4j}, \binom{1}{-1+4j}, \binom{1}{-1-4j} \\
& \binom{1}{4+j}, \binom{1}{4-j}, \binom{1}{-4+j}, \binom{1}{-4-j} \\
& \binom{2-j}{2+3j}, \binom{2-j}{2-3j}, \binom{2-j}{-2+3j}, \binom{2-j}{-2-3j}
\end{aligned}$$

$$\begin{aligned} & \left(\begin{array}{c} 2-j \\ 3+2j \end{array} \right), \left(\begin{array}{c} 2-j \\ 3-2j \end{array} \right), \left(\begin{array}{c} 2-j \\ -3+2j \end{array} \right), \left(\begin{array}{c} 2-j \\ -3-2j \end{array} \right) \\ & \left(\begin{array}{c} 1-2j \\ 2+3j \end{array} \right), \left(\begin{array}{c} 1-2j \\ 3-2j \end{array} \right), \left(\begin{array}{c} 1-2j \\ -3+2j \end{array} \right), \left(\begin{array}{c} 1-2j \\ -2-3j \end{array} \right) \end{aligned}$$