

G_I

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

G_III

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

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

$$\begin{pmatrix} \frac{1}{\sqrt{3}} & \mathbf{i} - \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} & \frac{1}{6} \left(-3 \mathbf{i} + \sqrt{3} \right) \end{pmatrix}$$

$$\begin{pmatrix} \frac{i}{\sqrt{3}} & 1 - \frac{i}{\sqrt{3}} \\ \frac{1}{6} (3 - i\sqrt{3}) & \frac{1}{6} (3 + i\sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{2} i (i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} \frac{1}{\sqrt{3}} & \frac{2}{\sqrt{3}} \\ \frac{1}{6} (3i - \sqrt{3}) & \frac{1}{6} (-3i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} \frac{1}{\sqrt{3}} & i - \frac{1}{\sqrt{3}} \\ \frac{1}{6} (3i - \sqrt{3}) & \frac{1}{6} (3i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} \frac{i}{\sqrt{3}} & 1 - \frac{i}{\sqrt{3}} \\ \frac{i}{\sqrt{3}} & \frac{1}{6} i (3i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} 1 & 0 \\ 0 & -\frac{1}{2} i (-i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} \frac{1}{\sqrt{3}} & \frac{2}{\sqrt{3}} \\ \frac{1}{6} (-3i - \sqrt{3}) & \frac{1}{6} (3i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} \frac{1}{\sqrt{3}} & i - \frac{1}{\sqrt{3}} \\ \frac{1}{6} (-3i - \sqrt{3}) & -\frac{1}{\sqrt{3}} \end{pmatrix} \\
\begin{pmatrix} \frac{i}{\sqrt{3}} & 1 - \frac{i}{\sqrt{3}} \\ -\frac{1}{6} i (-3i + \sqrt{3}) & -\frac{i}{\sqrt{3}} \end{pmatrix} \\
\begin{pmatrix} -i & 0 \\ 0 & -i \end{pmatrix} \\
\begin{pmatrix} -\frac{i}{\sqrt{3}} & -\frac{2i}{\sqrt{3}} \\ -\frac{i}{\sqrt{3}} & \frac{i}{\sqrt{3}} \end{pmatrix} \\
\begin{pmatrix} -\frac{i}{\sqrt{3}} & 1 + \frac{i}{\sqrt{3}} \\ -\frac{i}{\sqrt{3}} & -\frac{1}{6} i (-3i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} \frac{1}{\sqrt{3}} & -i - \frac{1}{\sqrt{3}} \\ \frac{1}{6} (-3i - \sqrt{3}) & \frac{1}{6} (-3i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} -i & 0 \\ 0 & (-1)^{1/6} \end{pmatrix} \\
\begin{pmatrix} -\frac{i}{\sqrt{3}} & -\frac{2i}{\sqrt{3}} \\ \frac{1}{6} (3 + i\sqrt{3}) & -\frac{1}{6} i (-3i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} -\frac{i}{\sqrt{3}} & 1 + \frac{i}{\sqrt{3}} \\ \frac{1}{6} (3 + i\sqrt{3}) & \frac{1}{6} (3 - i\sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} \frac{1}{\sqrt{3}} & -i - \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} & \frac{1}{6} (3i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} -i & 0 \\ 0 & (-1)^{5/6} \end{pmatrix}
\end{pmatrix}$$

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

$$\begin{pmatrix} \frac{i}{\sqrt{3}} & -1 - \frac{i}{\sqrt{3}} \\ \frac{i}{\sqrt{3}} & \frac{1}{6} (3 + i\sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} -\frac{1}{\sqrt{3}} & i + \frac{1}{\sqrt{3}} \\ \frac{1}{6} (3i + \sqrt{3}) & \frac{1}{6} (3i - \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} i & 0 \\ 0 & -(-1)^{1/6} \end{pmatrix} \\
\begin{pmatrix} \frac{i}{\sqrt{3}} & \frac{2i}{\sqrt{3}} \\ -\frac{1}{6}i (-3i + \sqrt{3}) & \frac{1}{6} (3 + i\sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} \frac{i}{\sqrt{3}} & -1 - \frac{i}{\sqrt{3}} \\ -\frac{1}{6}i (-3i + \sqrt{3}) & \frac{1}{6}i (3i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} -\frac{1}{\sqrt{3}} & i + \frac{1}{\sqrt{3}} \\ -\frac{1}{\sqrt{3}} & \frac{1}{6} (-3i - \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} i & 0 \\ 0 & -(-1)^{5/6} \end{pmatrix} \\
\begin{pmatrix} \frac{i}{\sqrt{3}} & \frac{2i}{\sqrt{3}} \\ \frac{1}{6} (3 - i\sqrt{3}) & \frac{1}{6}i (3i + \sqrt{3}) \end{pmatrix} \\
\begin{pmatrix} \frac{i}{\sqrt{3}} & -1 - \frac{i}{\sqrt{3}} \\ \frac{1}{6} (3 - i\sqrt{3}) & -\frac{i}{\sqrt{3}} \end{pmatrix} \\
\begin{pmatrix} -\frac{1}{\sqrt{3}} & i + \frac{1}{\sqrt{3}} \\ \frac{1}{6} (-3i + \sqrt{3}) & \frac{1}{\sqrt{3}} \end{pmatrix}$$

G_IV

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

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

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

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

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

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

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

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

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

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

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

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