$$\begin{pmatrix} \frac{1}{2} & \frac{1}{2} \\ 0 & \frac{1}{2} \end{pmatrix}^2 = \begin{matrix} \frac{1}{4} & \frac{1}{2} \\ 0 & \frac{1}{4} \end{matrix}$$

$$\psi_c\begin{pmatrix} \frac{1}{2} & \frac{1}{2} \\ 0 & \frac{1}{2} \end{pmatrix} = \begin{pmatrix} \frac{1}{2\sqrt{2}} & \frac{2}{2\sqrt{2}} \\ \frac{1}{2\sqrt{2}} & 0 \end{pmatrix} = \begin{matrix} \frac{1}{4}\sqrt{2} & \frac{1}{2}\sqrt{2} \\ \frac{1}{4}\sqrt{2} & 0 \end{matrix}$$

$$\psi_r\begin{pmatrix} \frac{1}{4}\sqrt{2} & \frac{1}{2}\sqrt{2} \\ \frac{1}{4}\sqrt{2} & 0 \end{pmatrix} = \begin{pmatrix} \frac{1}{\sqrt{2}}(\frac{1}{4}\sqrt{2}+\frac{1}{2}\sqrt{2}) & \frac{1}{\sqrt{2}}(\frac{1}{4}\sqrt{2}-\frac{1}{2}\sqrt{2}) \\ \frac{1}{\sqrt{2}}(\frac{1}{4}\sqrt{2}-0) & \frac{1}{\sqrt{2}}(\frac{1}{4}\sqrt{2}-0) \end{pmatrix} = \begin{matrix} \frac{3}{4} & -\frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{matrix}$$

$$\psi\begin{pmatrix} \frac{1}{2} & \frac{1}{2} \\ 0 & \frac{1}{2} \end{pmatrix} = \begin{matrix} \frac{3}{4} & -\frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{matrix}$$

$$\begin{pmatrix} \frac{3}{4} & -\frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix}^2 = \begin{matrix} \frac{1}{2} & -\frac{1}{4} \\ \frac{1}{4} & 0 \end{matrix}$$

$$\psi_r^{-1}\begin{pmatrix} \frac{1}{2} & -\frac{1}{4} \\ \frac{1}{4} & 0 \end{pmatrix} = \begin{pmatrix} (\frac{1}{\sqrt{2}})((\frac{1}{2})-(-\frac{1}{4})) & (\frac{1}{\sqrt{2}})((\frac{1}{2})+(-\frac{1}{4})) \\ (\frac{1}{\sqrt{2}})(\frac{1}{4}-(0)) & (\frac{1}{\sqrt{2}})(\frac{1}{4}-(0)) \end{pmatrix} = \begin{matrix} \frac{3}{8}\sqrt{2} & \frac{1}{8}\sqrt{2} \\ \frac{1}{8}\sqrt{2} & \frac{1}{8}\sqrt{2} \end{matrix}$$

$$\psi_c^{-1}\begin{pmatrix} \frac{3}{8}\sqrt{2} & \frac{1}{8}\sqrt{2} \\ \frac{1}{8}\sqrt{2} & \frac{1}{8}\sqrt{2} \end{pmatrix} = \begin{pmatrix} (\frac{1}{\sqrt{2}})(\frac{3}{8}\sqrt{2}-(\frac{1}{8}\sqrt{2})) & (\frac{1}{\sqrt{2}})(\frac{1}{8}\sqrt{2}-(\frac{1}{8}\sqrt{2})) \\ (\frac{1}{\sqrt{2}})(\frac{3}{8}\sqrt{2}+(\frac{1}{8}\sqrt{2})) & (\frac{1}{\sqrt{2}})(\frac{1}{8}\sqrt{2}+(\frac{1}{8}\sqrt{2})) \end{pmatrix} = \begin{matrix} \frac{1}{4} & 0 \\ \frac{1}{2} & \frac{1}{4} \end{matrix}$$

$$\psi^{-1}\begin{pmatrix} \frac{1}{2} & -\frac{1}{4} \\ \frac{1}{4} & 0 \end{pmatrix} = \begin{matrix} \frac{1}{4} & 0 \\ \frac{1}{2} & \frac{1}{4} \end{matrix}$$