1e

$$M_2 = \begin{bmatrix} -3 & 1 \\ 0 & 1 \end{bmatrix} \qquad R = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$$

$A = M_2 R$ $\quad B = R M_2$

$$A = \begin{bmatrix} -3 & 1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$$

$$B = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix} \begin{bmatrix} -3 & 1 \\ 0 & 1 \end{bmatrix}$$

$$A = \begin{bmatrix} -3 & 1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} -3\cos\theta - \sin\theta & -3\sin\theta + \cos\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$$

$$B = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix} \begin{bmatrix} -3\cos\theta & \cos\theta + \sin\theta \\ 3\sin\theta & -\sin\theta + \cos\theta \end{bmatrix}$$

$$A \neq B$$

1g

$$M_3 = \begin{bmatrix} 0.5 & 0 \\ 0 & 2 \end{bmatrix}$$

$$V_3 = \begin{bmatrix} 1/\sqrt{2} & -1/\sqrt{2} \\ -1/\sqrt{2} & -1/\sqrt{2} \end{bmatrix}$$

$C = M_3 V_3$ $\quad D = V_3 C$

$$C = \begin{bmatrix} 0.5 & 0 \\ 0 & 2 \end{bmatrix} \begin{bmatrix} 1/\sqrt{2} & -1/\sqrt{2} \\ -1/\sqrt{2} & -1/\sqrt{2} \end{bmatrix}$$

$$C = \begin{bmatrix} 1/2\sqrt{2} & -1/2\sqrt{2} \\ -2/\sqrt{2} & -2/\sqrt{2} \end{bmatrix}$$

$$D = \begin{bmatrix} 1/\sqrt{2} & -1/\sqrt{2} \\ -1/\sqrt{2} & -1/\sqrt{2} \end{bmatrix} \begin{bmatrix} 1/4 + 1 & -1/2 + 1 \\ -1/2 + 1 & 1/4 + 1 \end{bmatrix}$$

$$D = \begin{bmatrix} 1.25 & 0.75 \\ 0.75 & 1.25 \end{bmatrix} = M_4$$

$H = V_3 M_3$

$$\begin{bmatrix} 1/\sqrt{2} & -1/\sqrt{2} \\ -1/\sqrt{2} & -1/\sqrt{2} \end{bmatrix} \begin{bmatrix} 1/2\sqrt{2} & -2/\sqrt{2} \\ -1/2\sqrt{2} & -2/\sqrt{2} \end{bmatrix}$$

CI is halved
CII is doubled