

For time invariant δ ,

$$A = \begin{bmatrix} 0 & 1 \\ -(4+\delta) & -(5+2\delta) \end{bmatrix}$$

$$\Rightarrow \lambda^2 + (5+2\delta)\lambda + (4+\delta) = 0$$

$$\begin{array}{ll} \Rightarrow 5+2\delta > 0 & \Rightarrow \delta > -5/2 \\ 4+\delta > 0 & \Rightarrow \delta > -4 \end{array} \quad \left. \vphantom{\begin{array}{l} \Rightarrow 5+2\delta > 0 \\ \Rightarrow \delta > -4 \end{array}} \right\} \delta > -5/2$$