$$
\begin{aligned}
\dot{x} &= Ax + Bu \\
y &= Cx
\end{aligned}
\tag{1}
$$

Let $\mathcal{A}$ be the set of matrices with eigenvalues $l_i = \lambda_i$ and constants (determined by the transfer function) $k_j = c_j$. Define $\epsilon_i = |\lambda_i^* - \lambda_i|$ and ${}_j = |k_j^* - k_j| : j > i$ Let $\mathcal{L}$ be the set of matrices where $\sum_i^n \alpha_i \epsilon_i < \epsilon_0$

$$P \in \mathcal{P} \text{ if } PB = B \text{ and } CP^{-1} = C \text{ and } PAP^{-1} \in \mathcal{A} \tag{2}$$

For $C = [1\ 0]$ and $B = [1\ 1]^T$, $P_p = \begin{bmatrix} 1 & 0 \\ p & 1-p \end{bmatrix}$

$\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix} P_p A P_p^{-1} + \begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix} P_q A P_q^{-1} \ \notin \ \mathcal{L}$

$\lambda_{1,2} = \frac{1}{2}\left(\lambda_1 + \lambda_2 + x - \bar{x} \pm \left((\lambda_1 - \lambda_2)^2 - (x - \bar{x})\big((x + 3\bar{x}) + 2(\lambda_1 + \lambda_2) + \frac{4(\lambda_1 - \bar{x})(\lambda_2 - \bar{x})}{k + \bar{x}}\big) \right)^{1/2} \right)$

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