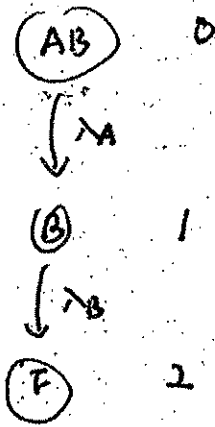


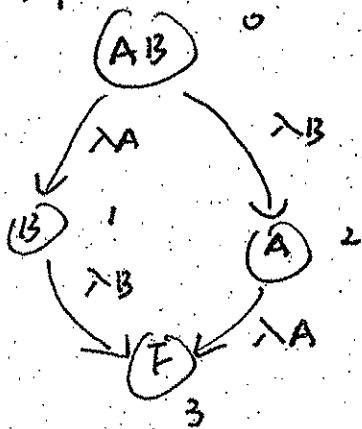
# Hands-on Problems (state-equations)

① CSP



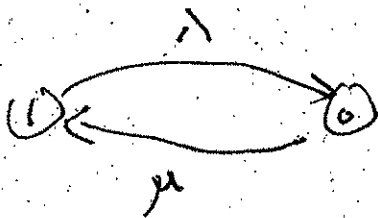
$$\begin{bmatrix} -\lambda_A & 0 & 0 \\ \lambda_A & -\lambda_B & 0 \\ 0 & \lambda_B & 0 \end{bmatrix} \begin{bmatrix} p_0(t) \\ p_1(t) \\ p_2(t) \end{bmatrix} = \begin{bmatrix} \dot{p}_0(t) \\ \dot{p}_1(t) \\ \dot{p}_2(t) \end{bmatrix}$$

② HSP



$$\begin{bmatrix} -(\lambda_A + \lambda_B) & 0 & 0 & 0 \\ \lambda_A & -\lambda_B & 0 & 0 \\ \lambda_B & 0 & -\lambda_A & 0 \\ 0 & \lambda_B & \lambda_A & 0 \end{bmatrix} \begin{bmatrix} p_0(t) \\ p_1(t) \\ p_2(t) \\ p_3(t) \end{bmatrix} = \begin{bmatrix} \dot{p}_0(t) \\ \dot{p}_1(t) \\ \dot{p}_2(t) \\ \dot{p}_3(t) \end{bmatrix}$$

③



$$\begin{bmatrix} -\mu & \lambda \\ \mu & -\lambda \end{bmatrix} \begin{bmatrix} p_0(t) \\ p_1(t) \end{bmatrix} = \begin{bmatrix} \dot{p}_0(t) \\ \dot{p}_1(t) \end{bmatrix}$$