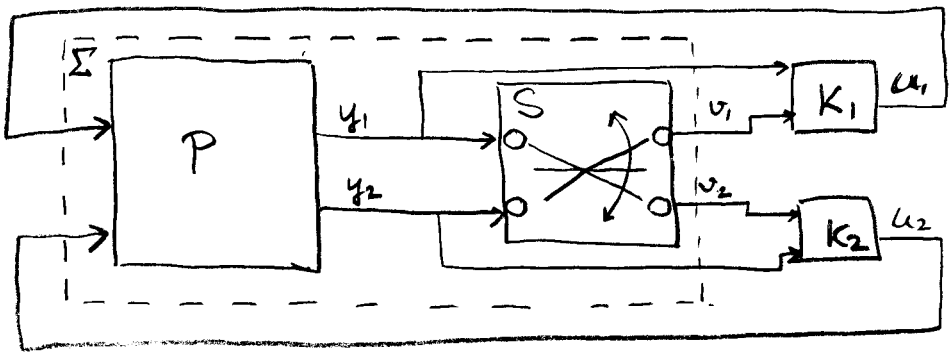
EE-150

'Stabilization with control networks'

Lecture notes

The Switch Box problem



Plant P is L.T.I.

State Eqns

$$x(k+1) = A_p x(k) + \sum_{j=1}^{2} B_{pj} u_j(k),$$

$$y_i(k) = C_{pi} x(k) + \sum_{j=1}^{2} D_{pij} u_j(k) \qquad i = 1, 2.$$

$$x(k) \in \mathbb{R}^n, \quad u_i(k) \in \mathbb{R}^{m_i}, \quad y_i(k) \in \mathbb{R}^{p_i}, \quad k \in \mathbb{Z}^+$$

K_i, $i = 1, 2$ are periodically time varying (PTV) local controllers with same period $N_K \geq 1$

State Eqns

$$\xi_i(k+1) = A_{Ki}(k)\xi_i(k) + B_{ki1}(k) y_i(k) + B_{Ki2}(k) v_i(k),$$

$$u_i(k) = C_{Ki}(k)\xi_i(k) + D_{ki1}(k) y_i(k) + D_{ki2}(k) v_i(k)$$

$$\xi_i(k) \in \mathbb{R}^{n_{Ki}}, \quad v_i(k) \in \mathbb{R}^{p_i}, \quad k \in \mathbb{Z}^+$$

PTV system with period N_K $\Longrightarrow$ $A_{Ki}(k) = A_{Ki}(k + N_K)$. The other system matrices satisfy the same relation.