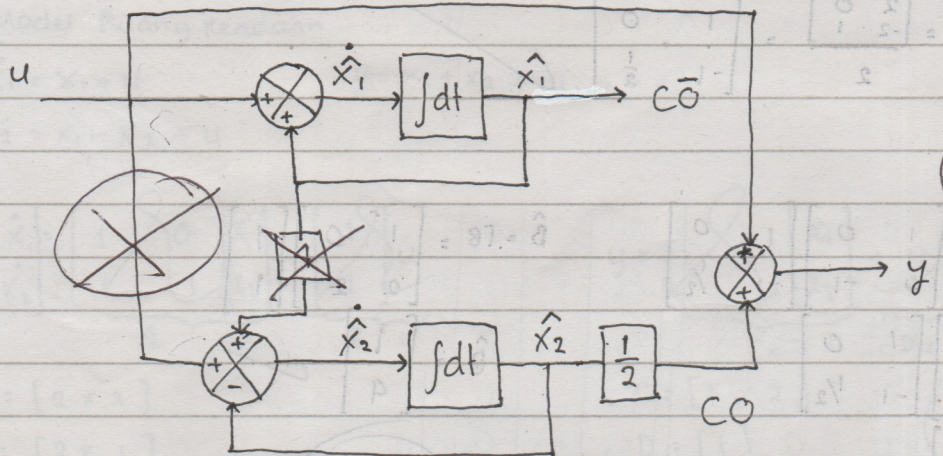


$$(f) \begin{bmatrix} \dot{\hat{x}}_1 \\ \dot{\hat{x}}_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 4 & -1 \end{bmatrix} \begin{bmatrix} \hat{x}_1 \\ \hat{x}_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 4 \end{bmatrix} u \quad \left\{ \begin{array}{l} \dot{\hat{x}}_1 = \hat{x}_1 + u \\ \dot{\hat{x}}_2 = 4\hat{x}_1 - \hat{x}_2 + 4u \end{array} \right.$$

$$[y] = \begin{bmatrix} 0 & 1/2 \end{bmatrix} \begin{bmatrix} \hat{x}_1 \\ \hat{x}_2 \end{bmatrix} + u \quad \left\{ y = 1/2 \hat{x}_2 + u \right.$$

Bagan kotak



(g). persamaan keluaran dari kendralan hasil transformasi: ~~separabilitas!~~

$\hat{x}_1$ = controllable and unobservable = $C\bar{O}$

$\hat{x}_2$ = controllable and observable = $C\bar{O}$.

$$(h). \hat{A} = [\bar{A} + BK]$$

$$= \begin{bmatrix} 1 & 0 \\ 4 & -1 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \end{bmatrix} [k_1, k_2]$$

$$= \begin{bmatrix} 1 & 0 \\ 4 & -1 \end{bmatrix} + \begin{bmatrix} k_1 & k_2 \\ k_1 & k_2 \end{bmatrix}$$

$$= \begin{bmatrix} 1+k_1 & k_2 \\ 4+k_1 & -1+k_2 \end{bmatrix}$$

$$[\bar{\lambda}I - \bar{A}] = \begin{bmatrix} \bar{\lambda}-1-k_1 & -k_2 \\ -4-k_1 & \bar{\lambda}+1-k_2 \end{bmatrix}$$

$$\det [\bar{\lambda}I - \bar{A}] = \bar{\lambda}-1-k_1 (\bar{\lambda}+1-k_2) - (-k_2)(-4-k_1)$$

$$= \bar{\lambda}^2 + \bar{\lambda} - \bar{\lambda}k_2 - \bar{\lambda} - 1 + k_2 - \bar{\lambda}k_1 - k_1 + k_1k_2 - (4k_2 + k_1k_2)$$

$$= \bar{\lambda}^2 - \bar{\lambda}k_2 - \bar{\lambda}k_1 + k_2 - k_1 + k_1k_2 - 1 - 4k_2 - k_1k_2$$

$$= \bar{\lambda}^2 - \bar{\lambda}k_2 - \bar{\lambda}k_1 - 3k_2 - k_1 - 1$$

$$= 1 + k_2 + k_1 - 3k_2 - k_1 - 1$$

$$= -2k_2$$

(misalnya $\hat{x}_1 = \hat{x}_2 = -1$)

03

02

06