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Sayfa 57

$$\dot{x}_1 = x_2$$

$$\dot{x}_2 = \frac{-bx_2 + M_p l \sin(x_3) x_4^2 - M_p g \sin(x_3) \cos(x_3) + u}{M_c + M_p - M_p \cos^2(x_3)}$$

$$\dot{x}_3 = x_4 \tag{1}$$

$$\dot{x}_4 = \frac{(bx_2 - u - M_p l \sin(x_3) x_4^2) \cos(x_3) + (M_c + M_p) g \sin(x_3)}{l(M_c + M_p - M_p \cos^2(x_3))}$$

$$x_1 := x, \; x_2 := \dot{x}, \; x_3 := \theta, \; x_4 := \dot{\theta}$$

Sayfa 58

$$\dot{x}_1 = x_2$$

$$\dot{x}_2 = -\frac{M_p g}{M_c} x_3 - \frac{b}{M_c} x_2 + \frac{1}{M_c} u$$

$$\dot{x}_3 = x_4 \tag{2}$$

$$\dot{x}_4 = \frac{(M_c + M_p) g}{M_c l} x_3 + \frac{b}{M_c l} x_2 - \frac{1}{M_c l} u$$

$$\dot{X} = A X + B u$$

$$y = C X \tag{3}$$

Sayfa 59

$$\dot{e} = A e + B u$$

$$y = C e + r \tag{5}$$

Sayfa 63

$$\dot{X} = (A - BK)\,X + BKx_d$$
$$y = Cx \tag{15}$$

$$\dot{X} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ -\dfrac{k_1}{M_c} & -\dfrac{b+k_2}{M_c} & -\dfrac{M_p g+k_3}{M_c} & -\dfrac{k_4}{M_c} \\ 0 & 0 & 0 & 1 \\ \dfrac{k_1}{M_c l} & \dfrac{b+k_2}{M_c l} & \dfrac{(M_c+M_p)g+k_3}{M_c l} & \dfrac{k_4}{M_c l} \end{bmatrix} X + \begin{bmatrix} 0 \\ \dfrac{k_1}{M_c} \\ 0 \\ -\dfrac{k_1}{M_c l} \end{bmatrix} r \tag{16}$$

$$y = x_1.$$