

Kısa Sınav I - 2010 (OKS)

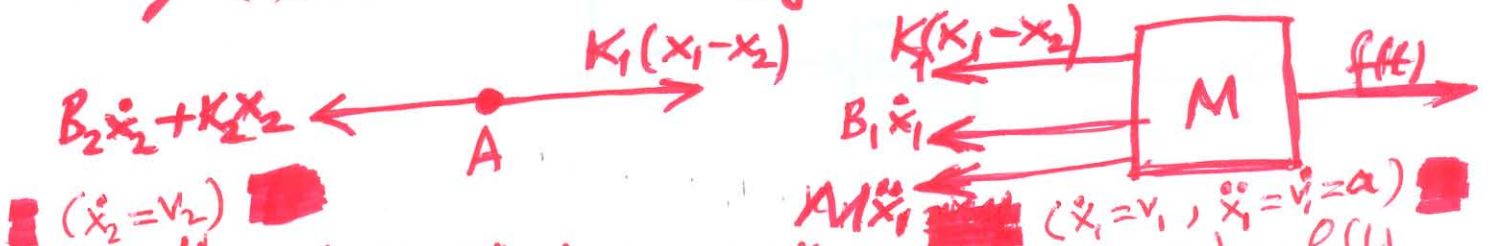
II GÖZÜMLERİ

$$1) \frac{C(s)}{R(s)} = G_4(s) \cdot \frac{K \frac{G_3(s)}{1+G_1(s)G_2(s)}}{1+G_4(s) \frac{K \frac{G_3(s)}{1+G_2(s)G_3(s)}}{(G_5(s)+G_6(s))}}$$

Transfer fonksiyonu,

$$T(s) = \frac{C(s)}{R(s)} = \frac{K G_3(s) G_4(s) (G_5(s) + G_6(s))}{1 + G_2(s) G_3(s) + K G_3(s) G_4(s)}$$

2) (a) Serbest Cisim Diyagramları:



Hareket Denklemleri:

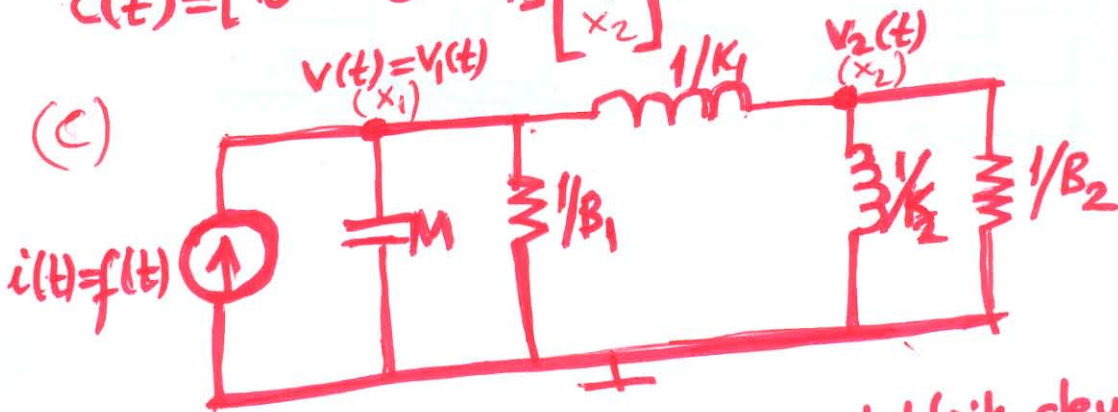
$k=2$ (serbestlik derecesi)
 $n=3$ (sistem mertebesi)

$$\begin{aligned} M\ddot{x}_1 + B_1\dot{x}_1 + K(x_1 - x_2) &= f(t) \\ B_2\dot{x}_2 + K_2x_2 &= K_1(x_1 - x_2) \end{aligned}$$

(b) $x = (x_1, \dot{x}_1, x_2)$ ($n=3$ olduğundan)
Durum uzayı matematik modeli:

$$\dot{x}(t) = \begin{bmatrix} \dot{x}_1(t) \\ \ddot{x}_1(t) \\ \dot{x}_2(t) \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ -K_1/M & -B_1/M & K_1/M \\ K_1/B_2 & 0 & -(K_1+K_2)/M \end{bmatrix} \begin{bmatrix} x_1(t) \\ \dot{x}_1(t) \\ x_2(t) \end{bmatrix} + \begin{bmatrix} 0 \\ 1/M \\ 0 \end{bmatrix} f(t)$$

$$C(t) = [0 \quad 0 \quad 1] \begin{bmatrix} x_1 \\ \dot{x}_1 \\ x_2 \end{bmatrix}$$



($i \leftrightarrow f$ benzetimine göre elektrik devre eşdeğeri)