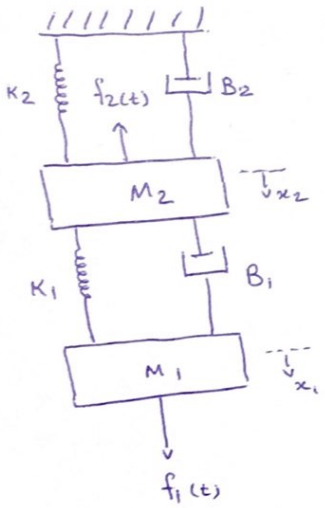
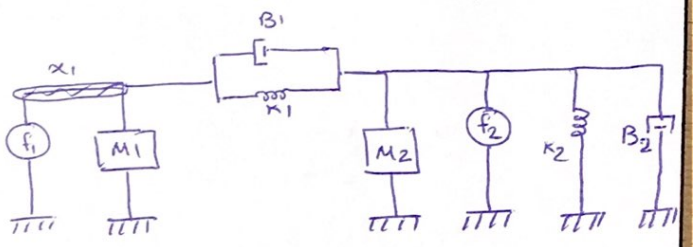
یا لطیف

رضا ادیب پور
۹۸۱۴۳۰۳
امتحان میان ترم کنترل خطی

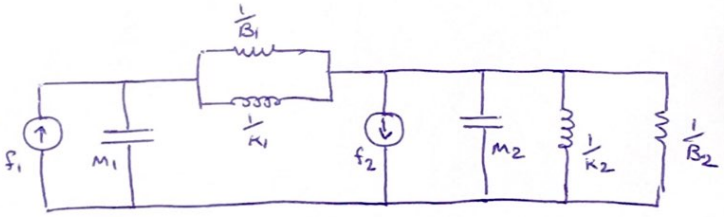
#1



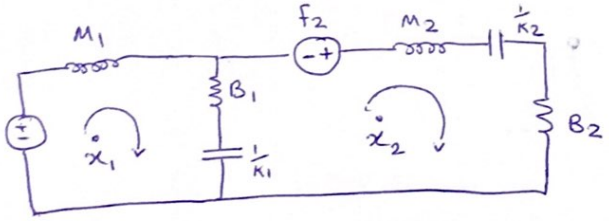
شبیه سازی مکانیکی:



معادل نیروی مشابه:



معادل ولتاژی مشابه:



$$KVL①: -f_1 + M_1\ddot{x}_1 + B_1(\dot{x}_1 - \dot{x}_2) + K_1(x_1 - x_2) = 0 \Rightarrow f_1 = M_1\ddot{x}_1 + B_1(\dot{x}_1 - \dot{x}_2) + K_1(x_1 - x_2)$$

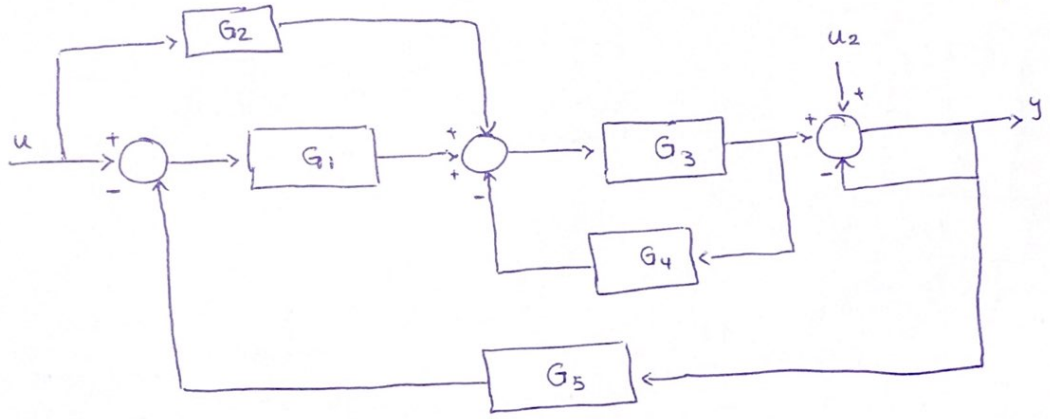
$$KVL②: -f_2 + M_2\ddot{x}_2 + K_2x_2 + B_2\dot{x}_2 + K_1(x_2 - x_1) + B_1(x_2 - x_1) = 0$$

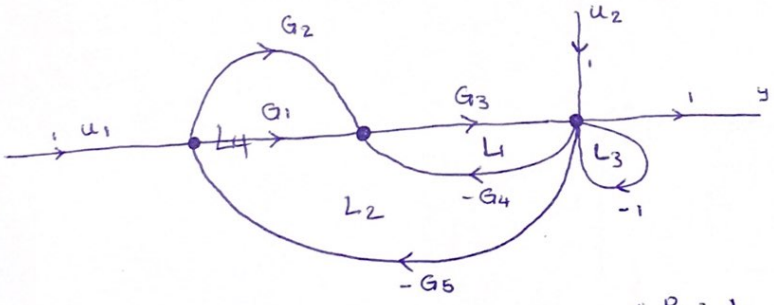
$$\Rightarrow f_2 = M_2\ddot{x}_2 + B_2\dot{x}_2 + x_2(K_1 + K_2 + B_1) - x_1(K_1 + B_1)$$

یا لطیف

رضا دینه بد
۹۸۱۴۲۵۴
امتحان میانترم کنترل خطی

#2





$$T_{ij} = \frac{y}{u_2} = \frac{\sum_k P_{ijk}\,\Delta_{ijk}}{\Delta}$$

مسیرها $\begin{cases} P_1 = 1 \end{cases}$

حلقه‌ها $\begin{cases} L_1 = -G_3G_4 \\ L_2 = -G_1G_3G_5 \\ L_3 = -1 \\ L_4 = -G_2G_3G_5 \end{cases}$

$$\Delta = 1 - \sum L_n + \sum L_nL_m - \sum L_mL_nL_p + \dots = 1 - \left(-G_3G_4 - G_1G_3G_5 - 1 - G_2G_3G_5\right) + 0$$

$$\Delta = 1 + 1 + G_3G_4 + G_1G_3G_5 = 2 + G_3G_4 + G_1G_3G_5 + G_2G_3G_5$$

دترمینان مسیر ۱: $\Delta_1 = 1 \Rightarrow \frac{y}{u_2} = \frac{P_1\Delta_1}{\Delta} = \frac{1}{2 + G_3G_4 + G_1G_3G_5 + G_2G_3G_5}$

یا لطیف

رضا آذرپیرا
۹۸۱۴۳۵۰۳
امتحان میانترم کنترل خطی

#3

$$G(s) = \frac{C(s)}{r(s)} = \frac{s^2+1}{2s^3+4s^2+6s+10} \times \frac{s^{-3}}{s^{-3}} \times \frac{\bar{X}}{\bar{X}}$$

$$\Rightarrow G(s) = \bar{X}s^{-3} + \bar{X}s^{-1} \quad , \quad r(s) = 10\bar{X}s^{-3} + 6\bar{X}s^{-2} + 4\bar{X}s^{-1} + 2\bar{X}$$

$$\Rightarrow \bar{X} = 0.5\,r(s) - 5\bar{X}s^{-3} - 3\bar{X}s^{-2} - 2\bar{X}s^{-1} \rightarrow \quad \bar{X} = x_1,\ \dot{\bar{X}} = x_2,\ \ddot{\bar{X}} = x_3$$

$$\Rightarrow \begin{cases} \dot{x}_1 = x_2 \\ \dot{x}_2 = x_3 \\ x_3 = -5x_1 - 3x_2 - 2x_3 + \frac{1}{2}r(s) \end{cases} \quad , \quad C = x_1 + x_3$$