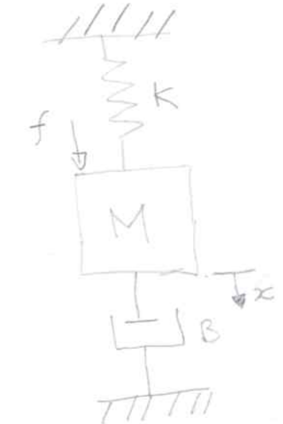
practice

2a)



$$\boxed{\sum F_R = m\, a_{(t)}}$$

$$f_{(t)} - K x_{(t)} - B \dot{x}_{(t)} = M \ddot{x}_{(t)}$$

$$\mathcal{L} \quad F_{(s)} - K X_{(s)} - B S X_{(s)} = S^2 M X_{(s)}$$

$$F_{(s)} = S^2 M X_{(s)} + K X_{(s)} + SB X_{(s)}$$
$$= (S^2 M + K + SB) X_{(s)}$$

$$G_{(s)} = \frac{X_{(s)}}{F_{(s)}} = \frac{1 \;\; \times\frac{1}{M}}{S^2 M + SB + K \;\; \times\frac{1}{M}}$$
$$= \frac{\frac{1}{M}}{S^2 + S\frac{B}{M} + \frac{K}{M}}$$

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2 b)

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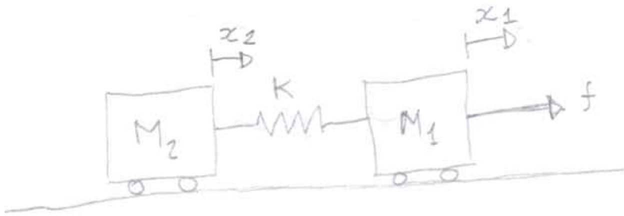


$$\boxed{\sum F_R = m\, \ddot{x}_{(t)}}$$

$$\begin{cases} f_{(t)} - K(x_1 - x_2) = M_1 \ddot{x}_{1(t)} \\ -K(x_2 - x_1) = M_2 \ddot{x}_{2(t)} \end{cases} \quad \mathcal{L} \quad \begin{cases} F_{(s)} - K.X_{1(s)} + K.X_{2(s)} = S^2.M_1 X_{1(s)} \\ -K.X_{2(s)} + K.X_{1(s)} = S^2.M_2 X_{2(s)} \end{cases}$$

$$\boxed{G_{(s)} = \frac{X_{2(S)}}{F_{(S)}}} \qquad \begin{cases} F_{(s)} - (S^2 M_1 + K) X_{1(s)} + K X_{2(s)} = 0 \\ -(S^2 M_2 + K) X_{2(s)} + K X_{1(s)} = 0 \end{cases}$$

$$X_{1(S)} = \frac{(S^2 M_2 + K)}{K} X_{2(S)}$$

$$F_{(s)} = (S^2 M_1 + K) \cdot \frac{(S^2 M_2 + K)}{K} X_{2(S)} - K X_{2(s)} = 0$$
$$= \left(\frac{(S^2 M_1 + K)(S^2 M_2 + K)}{K} - K \right) X_{2(s)}$$
$$= \frac{(S^2 M_1 + K)(S^2 M_2 + K) - K^2}{K} X_{2(s)}$$

$$\frac{X_{2(S)}}{F_{(S)}} = \frac{K}{(S^2 M_1 + K)(S^2 M_2 + K) - K^2}$$

Ph tesis homework

2a) $FT = \frac{X_{(s)}}{F_{(s)}}$

$$\boxed{\sum F_{(t)} = M \ddot{x}_{(t)}}$$

$$f_{(t)} - K x_{(t)} - B \dot{x}_{(t)} = M \ddot{x}_{(t)}$$

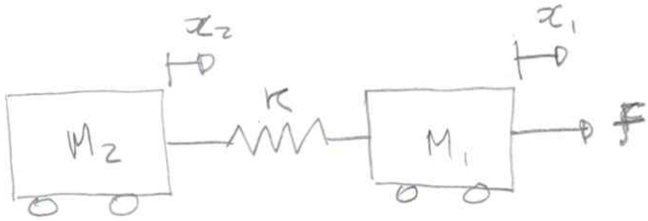
$$\mathcal{L}$$

$$F_{(s)} - K X_{(s)} - B s X_{(s)} = M s^2 X_{(s)}$$

$$F_{(s)} = (s^2 M + sB + K) X_{(s)}$$

$$\frac{X_{(s)}}{F_{(s)}} = \frac{1}{s^2 M + sB + K}$$

2b)



$$f_{(t)} - K\cdot(x_{1(t)} - x_{2(t)}) = M_1 \ddot{x}_1(t)$$

$$\mathcal{L}$$

$$F_{(s)} - K X_{1(s)} + K X_{2(s)} = M_1 s^2 X_{1(s)}$$

$$K(x_{1(t)} - x_{2(t)}) = M_2 \ddot{x}_2(t)$$

$$\mathcal{L}$$

$$K X_{1(s)} - K X_{2(s)} = M_2 s^2 X_{2(s)}$$

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$$F_{(s)} + K X_{2(s)} = X_{1(s)} (M_1 s^2 + K)$$

$\therefore$

$$\frac{K F_{(s)}}{M_1 s^2 + K} + \frac{K^2}{M_1 s^2 + K} X_{2(s)} - K X_{2(s)} = M_2 s^2 X_{2(s)}$$