$$\frac{d}{dt}\begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix} \cdot \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} + \begin{bmatrix} 2e^{3t} + \cos(2t) \\ t^2 + 4t \end{bmatrix}$$

$$\bar{x}(0) = \begin{bmatrix} 5 \\ -5 \end{bmatrix}$$

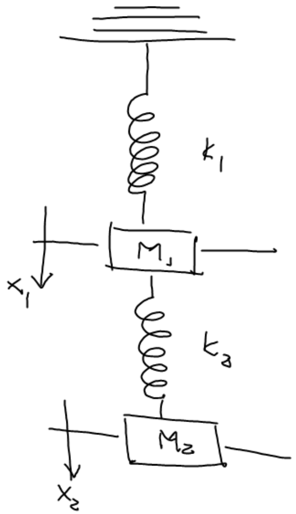
$\frac{d}{dt}\bar{x} = A\bar{x} + \bar{b}(t)$ S(2) EDO(1) L CC NH

$$\bar{x} = e^{At}\cdot\bar{x}(0) + \int_0^t e^{A(t-\tau)}\,\bar{b}(\tau)\,d\tau$$

$$e^{At}\cdot\bar{x}(0)\Big|_{t=0} = X_{cero} \qquad \int_0^t e^{A(t-\tau)}\,\bar{b}(\tau)\,d\tau\,\Big|_{t=0} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\frac{d}{dt}\bar{x}(t) = A\bar{x}(t) + \bar{b}(t) \qquad \bar{x}(a)$$

$$\bar{x}(t) = e^{A(t-a)} \cdot \bar{x}(a) + \int_a^t e^{A(t-\tau)} \bar{b}(\tau)\, d\tau.$$



$$M_1 \frac{d^2 x_1(t)}{dt^2} = \sum_{i=1}^{2} F_i$$

$$= -k_1 x_1 + k_2 (x_2 - x_1)$$

$$M_2 \frac{d^2 x_2(t)}{dt^2} = \sum_{j=1}^{2} F_j$$

$$= -k_2 (x_2 - x_1)$$

$$\frac{d^2 x_1(t)}{dt^2} = -\frac{k_1}{M_1} x_1 + \frac{k_2}{M_1}(x_2 - x_1)$$

$$\frac{d^2 x_2(t)}{dt^2} = -\frac{k_2}{M_2}(x_2 - x_1)$$

$$\frac{dx_1}{dt} = x_3$$

$$\frac{dx_3}{dt}$$

$$\frac{dx_2}{dt} = x_4$$

$$\frac{dx_4}{dt},$$

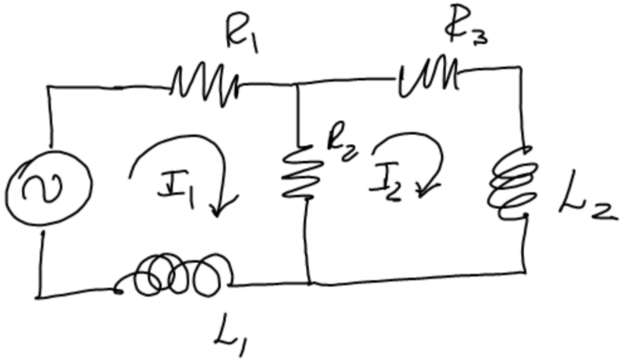
$$\frac{dx_1}{dt} = x_3$$

$$\frac{dx_2}{dt} = x_4$$

$$\frac{dx_3}{dt} = \left(-\frac{k_1}{M_1} - \frac{k_2}{M_1}\right) x_1 + \frac{k_2}{M_1} x_2$$

$$\frac{dx_4}{dt} = \frac{k_2}{M_2} x_1 - \frac{k_2}{M_2} x_2$$

$$\frac{d}{dt}\begin{bmatrix} x_1(t) \\ x_2(t) \\ x_3(t) \\ x_4(t) \end{bmatrix} = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ -\left(\frac{k_1}{M_1} + \frac{k_2}{M_1}\right) & \frac{k_2}{M_1} & 0 & 0 \\ \frac{k_2}{M_2} & -\frac{k_2}{M_2} & 0 & 0 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \\ x_3(t) \\ x_4(t) \end{bmatrix}$$



$$R_1 I_1 + R_2 (I_1 - I_2) + L_1 \frac{dI_1}{dt} = 120 \operatorname{sen}(60(\pi(t)))$$

$$R_2 (I_2 - I_1) + R_3 I_2 + L_2 \frac{dI_2}{dt} = 0$$

$$L_1 \frac{dI_1}{dt} = -(R_1 + R_2) I_1 + R_2 I_2 + 120 \operatorname{sen}(60\pi t)$$

$$L_2 \frac{dI_2}{dt} = + R_2 I_1 - (R_3 + R_2) I_2$$

$$\frac{dI_1}{dt} = -\frac{(R_1 + R_2)}{L_1} I_1 + \frac{R_2}{L_1} I_2 + 120 \operatorname{sen}(60\pi t)$$

$$\frac{dI_2}{dt} = \frac{R_2}{L_2} I_1 - \frac{(R_3 + R_2)}{L_2} I_2$$

$$\frac{d}{dt} \begin{bmatrix} I_1(t) \\ I_2(t) \end{bmatrix} = \begin{bmatrix} -\frac{(R_1+R_2)}{L_1} & \frac{R_2}{L_1} \\ \frac{R_2}{L_2} & -\frac{(R_3+R_2)}{L_2} \end{bmatrix} \begin{bmatrix} I_1(t) \\ I_2(t) \end{bmatrix} + \begin{bmatrix} 120 \operatorname{sen}(60\pi t) \\ 0 \end{bmatrix}$$