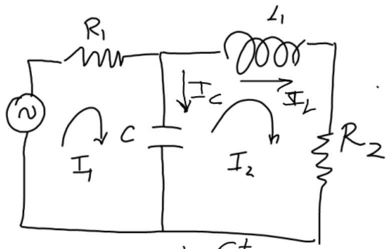


$$E(t) = 120\cos(60(2\pi)t)$$

$R_1 = 1$ ohm

$L = 10$ henry

$C = \frac{1}{10}$ Farad

$R_2 = 3$ ohm

$$\left.\begin{array}{l} I_1(0) = 0 \\ I_2(0) = 0 \end{array}\right\}$$

$$V_C = \frac{1}{C}\int_0^t I_C(z)\,dz$$

$$I_C = C\frac{dV_C}{dt}$$

$$E(t) = V_{R_1} + V_C$$

$$E(t) = R_1 I_1(t) + V_C$$

$$I_1(t) = I_C + I_L$$

$$= C\frac{dV_C}{dt} + I_L$$

$$E(t) = R_1\left(C\frac{dV_C}{dt} + I_L\right) + V_C$$

$$R_1 C\frac{dV_C}{dt} = -R_1 I_L - V_C + E(t)$$

$$\Longrightarrow \quad \frac{dV_C}{dt} = -\frac{1}{C}I_L - \frac{1}{R_1 C}V_C + \frac{1}{R_1 C}E(t)$$

$$V_C = V_L + V_{R_2}$$

$$V_C = L\frac{dI_L}{dt} + R_2 I_L$$

$$\Longrightarrow \quad \frac{dI_L}{dt} = \frac{1}{L}V_C - \frac{R_2}{L}I_L$$

$V_C(0) = 0$

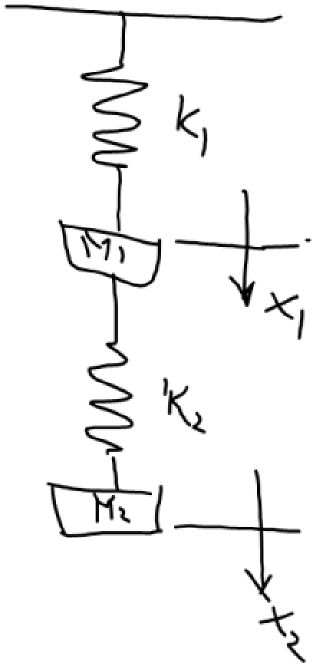
$I_L(0) = 0$

$$\frac{dV_C}{dt} = -10V_C - 10I_L + 120\cos(120\pi t)$$

$$\frac{dI_L}{dt} = \frac{1}{10}V_C - \frac{3}{10}I_L$$

$$\frac{d}{dt}\begin{bmatrix} V_C \\ I_L \end{bmatrix} = \begin{bmatrix} -10 & -10 \\ \frac{1}{10} & -\frac{3}{10} \end{bmatrix}\begin{bmatrix} V_C \\ I_L \end{bmatrix} + \begin{bmatrix} 120\cos(120\pi t) \\ 0 \end{bmatrix}$$

$$\bar{X} = e^{At}\bar{X}(0) + \int_0^t e^{A(t-z)}\bar{b}(z)\,dz$$



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

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

$$x_1(0) = \frac{1}{10} \qquad x_2(0) = \frac{1}{10}$$

$$\frac{dx_1}{dt}(0) = 0 \qquad \frac{dx_2}{dt}(0) = 0$$

$$\frac{dx_1}{dt} = V_1(t) \qquad \frac{dx_2}{dt} = V_2(t)$$

$$\bar{X} \begin{bmatrix} x_1 \\ x_2 \\ V_1 \\ V_2 \end{bmatrix}$$

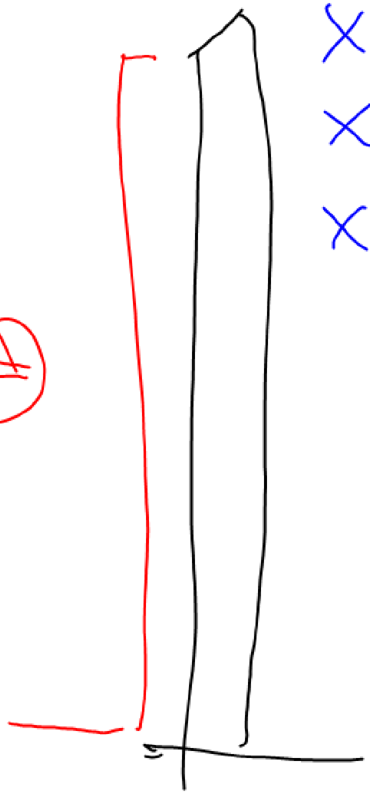
$$\frac{dx_1}{dt} = V_1(t)$$

$$\frac{dx_2}{dt} = V_2(t)$$

$$\frac{dV_1}{dt} = \frac{1}{M_1}\left(-k_1 - k_2\right) x_1(t) + \frac{K_2}{M_1} x_2(t)$$

$$\frac{dV_2}{dt} = \frac{K_2}{M_2} x_1(t) - \frac{k_2}{M_2} x_2(t)$$

$L =$



$X(t_f) = L$

$X'(t_f) = 0$

$X''(t_f) = 0$ Sacudida

$$\frac{da}{dt} \leq 1.6\ ft/seg^3$$

$$\frac{d^3x}{dt^3} \leq 1.6\ ft/seg^3$$

$X(0) = 0$

$X'(0) = 0$

$X''(0) = 0$