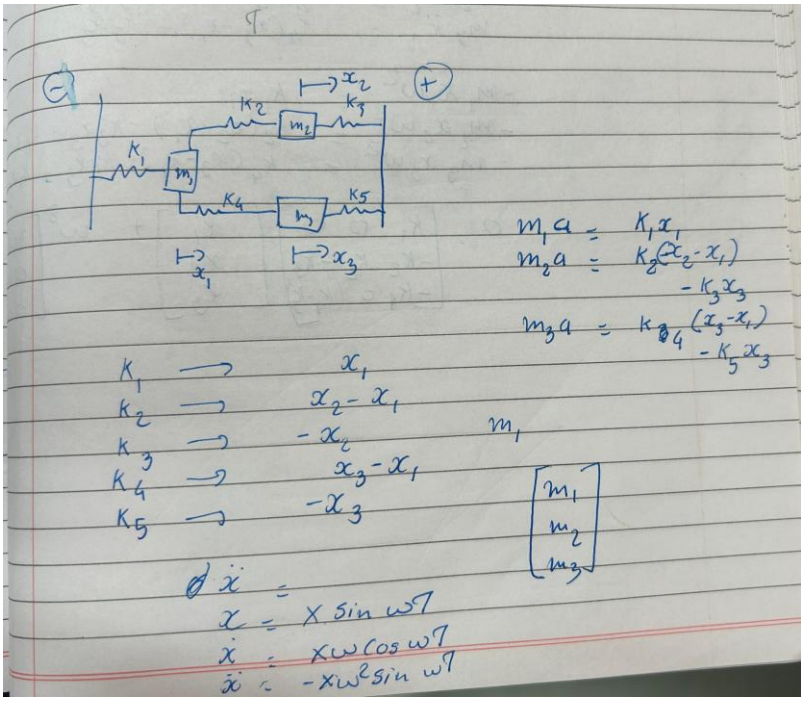
Formulas:



$$m_1 a = K_1 x_1$$
$$m_2 a = K_2(x_2 - x_1) - K_3 x_3$$
$$m_3 a = K_4(x_3 - x_1) - K_5 x_3$$

$K_1 \rightarrow x_1$
$K_2 \rightarrow x_2 - x_1$
$K_3 \rightarrow -x_2$
$K_4 \rightarrow x_3 - x_1$
$K_5 \rightarrow -x_3$

m_1

$$\begin{bmatrix} m_1 \\ m_2 \\ m_3 \end{bmatrix}$$

$\ddot{x}$ =
$x = X \sin \omega t$
$\dot{x} = X\omega \cos \omega t$
$\ddot{x} = -X\omega^2 \sin \omega t$

$$m_1 a = K_1 x_1$$
$$m_2 a = K_2(x_2 - x_1) - K_3 x_3$$
$$m_3 a = K_4(x_3 - x_1) - K_5 x_3$$

$$m_1 \ddot{x}_1 = K_1 x_1$$
$$m_2 \ddot{x}_2 = K_2(x_2 - x_1) - K_3 x_3$$
$$m_3 \ddot{x}_3 = K_4(x_3 - x_1) - K_5 x_3$$

$$-m_1 x_1 \omega^2 = K_1 x_1$$
$$-m_2 x_2 \omega^2 = K_2(x_2 - x_1) - K_3 x_3 = K_2 x_2 - K_2 x_1 - K_3 x_3$$
$$-m_3 x_3 \omega^2 = K_4(x_3 - x_1) - K_5 x_3 = K_4 x_3 - K_4 x_1 - K_5 x_3$$

$$0 = \begin{bmatrix} K_1 & 0 & 0 \\ -K_2 & K_2 & -K_3 \\ -K_4 & 0 & (K_4 - K_5) \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \omega^2 \begin{bmatrix} m_1 & 0 & 0 \\ 0 & m_2 & 0 \\ 0 & 0 & m_3 \end{bmatrix}$$