



$$F_1 + k(x_2 - x_1) + c(\dot{x}_2 - \dot{x}_1) - k \cdot x_1 - c \cdot \dot{x}_1 = m_1 \cdot \ddot{x}_1$$

$$-k(x_2 - x_1) - c(\dot{x}_2 - \dot{x}_1) = m_2 \ddot{x}_2$$

$$\ddot{x}_1 = \frac{1}{m_1} (F_1 + kx_2 - kx_1 + c\dot{x}_2 - c\dot{x}_1 - kx_1 - c\dot{x}_1)$$

$$\ddot{x}_2 = \frac{1}{m_2} (kx_1 - kx_2 + c\dot{x}_1 - c\dot{x}_2)$$

$$x = \begin{bmatrix} x \\ \dot{x} \\ y \\ \dot{y} \end{bmatrix} \Rightarrow$$

$$\dot{x} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ \frac{-2K}{m_1} & \frac{-2c}{m_1} & \frac{K}{m_1} & \frac{c}{m_1} \\ 0 & 0 & 0 & 1 \\ \frac{K}{m_2} & \frac{c}{m_2} & \frac{-K}{m_2} & \frac{-c}{m_2} \end{bmatrix} \begin{bmatrix} x \\ \dot{x} \\ y \\ \dot{y} \end{bmatrix} + \begin{bmatrix} 0 \\ 1/m_1 \\ 0 \\ 0 \end{bmatrix} f_1$$