$$m_1 \ddot{x}_1 = \sum F$$

$$m_1 \ddot{x}_1 = F_1 + K_2(x_2 - x_1) + c_2(\dot{x}_2 - \dot{x}_1) - K_1(x_1) - c_1(\dot{x}_1)$$

$$m_1 \ddot{x}_1 = F_1 + x_1(-K_2 + -K_1) + x_2(K_2) + \dot{x}_1(-c_2 + -c_1) + \dot{x}_2(c_2)$$

$m_1 \ddot{x}_1 = F$

$F_2 - K_2(x_2 - x_1) - K_2 x_2$

$$m_2 \ddot{x}_2 = \sum F$$

$$m_2 \ddot{x}_2 = F_2 - K_2(x_2 - x_1) - c_2(\dot{x}_2 - \dot{x}_1) - K_3(x_2) - c_3(\dot{x}_2)$$

$$m_2 \ddot{x}_2 = F_2 + x_1(K_2) + x_2(-K_2 + -K_3) + \dot{x}_1(c_2) + \dot{x}_2(-c_2 + -c_3)$$

$$\begin{bmatrix} m_1 & 0 \\ 0 & m_2 \end{bmatrix} \begin{pmatrix} \ddot{x}_1 \\ \ddot{x}_2 \end{pmatrix} + \begin{bmatrix} (c_1+c_2) & -c_2 \\ -c_2 & (c_2+c_3) \end{bmatrix} \begin{pmatrix} \dot{x}_1 \\ \dot{x}_2 \end{pmatrix} + \begin{bmatrix} (K_1+K_2) & -K_2 \\ -K_2 & (K_2+K_3) \end{bmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} F_1 \\ F_2 \end{pmatrix}$$