for mass m_1

$$f(k_1) + f(b) + f(m_1) = 0$$

$$k_1(y_1 - y_2) + b(\dot{y}_1 - \dot{y}_2) + m\ddot{y}_1 = 0$$

$$m\ddot{y}_1 = -k_1(y_1 - y_2) - b(\dot{y}_1 - \dot{y}_2) \quad - ①$$

for mass m_2

$$F(bump) = f(m_2) + f(k_1) + f(b) + f(k_2)$$

$$f(bump) = m_2\ddot{y}_2 + k_1(y_2 - y_1) + b(\dot{y}_2 - \dot{y}_1) + k_2 y_2$$

$$m_2\ddot{y}_2 = f(bump) - k_1(y_2 - y_1) - b(\dot{y}_2 - \dot{y}_1) - k_2 y_2 \quad - ②$$

Therefore diff equation are

$$m_1\ddot{y}_1 = k_1(y_2 - y_1) + b(\dot{y}_2 - \dot{y}_1)$$

$$m_2\ddot{y}_2 = f(bump) - k_1(y_2 - y_1) - b(\dot{y}_2 - \dot{y}_1) - k_2 y_2$$