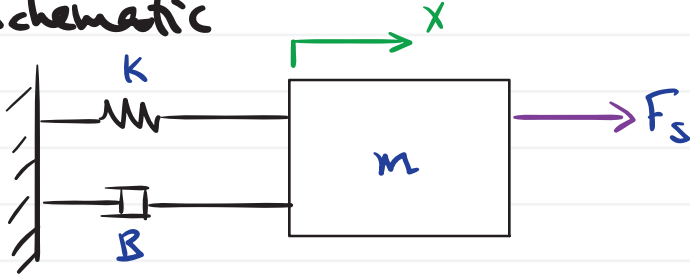
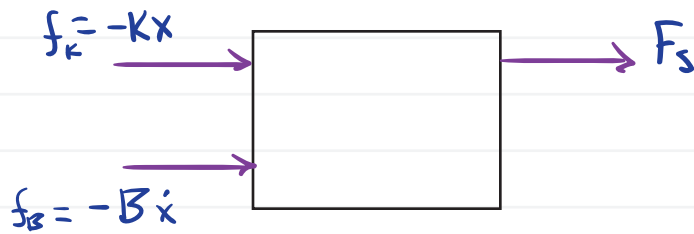


Schematic



FBO



Newton's Second Law

$$f_k + f_B + F_s = m \ddot{x}$$

$$m \ddot{x} - f_k - f_B = F_s$$

$$m \ddot{x} + B \dot{x} + Kx = F_s \Rightarrow$$

$$\ddot{x} = \frac{1}{m} (F_s - B \dot{x} - Kx)$$

Set it up for MATLAB

$$\left. \begin{array}{l} y_1(t) = x(t) \\ y_2(t) = \dot{x}(t) \end{array} \right\} \rightarrow \vec{y}(t) = \begin{bmatrix} y_1(t) \\ y_2(t) \end{bmatrix} .$$

$$\dot{\vec{y}}(t) = \begin{bmatrix} \dot{y}_1(t) \\ \dot{y}_2(t) \end{bmatrix} = \begin{bmatrix} y_2(t) \\ \frac{1}{m} (F_s - B y_2(t) - K y_1(t)) \end{bmatrix}$$