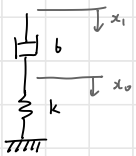
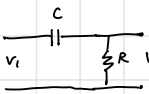
Example: Obtain the transfer equation functions of the following systems



$\frac{x_o}{x_i} = ?$



$\frac{V_o}{V_i} = ?$

For a massless point A:

$$-kx_o + b(\dot{x}_i - \dot{x}_o) = 0$$

$$b(\dot{x}_i - \dot{x}_o) = kx_o$$

$$bs(x_i - x_o) = kx_o$$

$$bsx_i - bsx_o = kx_o$$

$$bsx_i = (k + bs)x_o$$

$$\frac{x_o}{x_i} = \frac{bs}{k + bs} = \frac{\frac{b}{k}s}{1 + \frac{b}{k}s}$$

$$V_i = \left(R + \frac{1}{Cs}\right) I$$

$$I = \frac{V_o}{R}$$

$$V_i = \frac{RCs + 1}{RCs} V_o$$

$$\frac{V_o}{V_i} = \frac{RCs}{1 + RCs}$$