



$$\hookrightarrow Ls$$

$$L = m$$

$$\hookrightarrow \frac{1}{Cs}$$

$$C = \frac{1}{K}$$

$$R = \Omega$$

$$R = c$$

$$\frac{V_i(s) - V_o(s)}{Ls} - \frac{V_o(s)}{R} - \frac{V_o(s)}{\frac{1}{Cs}} = 0 \quad H(s) = \frac{V_o(s)}{V_i(s)}$$

$$\frac{V_i(s)}{Ls} - \frac{V_o(s)}{Ls} - \frac{V_o(s)}{R} - V_o(s)Cs = 0$$

$$V_o(s) \left( -\frac{1}{Ls} - \frac{1}{R} - Cs \right) = -\frac{V_i(s)}{Ls}$$

$$\frac{V_o(s)}{V_i(s)} = -\frac{1}{Ls \left( -\frac{1}{Ls} - \frac{1}{R} - Cs \right)}$$

$$\frac{V_o(s)}{V_i(s)} = -\frac{1}{-1 - \frac{Ls}{R} - LCs^2}$$

$$H(s) = \frac{1}{1 + \frac{Ls}{R} + LCs^2}$$

$$H(s) = \frac{1}{LCs^2 + \frac{Ls}{R} + 1}$$

Forma Canonica:  $\hat{H}(s) = K \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2}$

$$K = \frac{1}{c}$$

$$H(s) = \frac{1}{\frac{m}{K}s^2 + \frac{ms}{c} + 1}$$

$$C = \frac{1}{K}$$

$$a_0 = 1$$

$$a_1 = \frac{m}{c}$$

$$a_2 = \frac{m}{K}$$

$$K = 1 \quad \omega_n^2 = \frac{1}{\frac{m}{K}} = Km$$

$$\omega_n = \sqrt{Km}$$

$$\zeta = \frac{\frac{m}{c}}{2\sqrt{1 \cdot \frac{m}{K}}}$$

$$\zeta = \frac{m}{2c\sqrt{\frac{m}{K}}}$$



$$\hat{H}(s) = 1 \cdot \frac{km}{s^2 + 2 \frac{m}{2c\sqrt{\frac{m}{k}}} \sqrt{km} s + km}$$

$$\begin{aligned} \hat{H}(s) &= \frac{km}{s^2 + \frac{m}{c\sqrt{\frac{m}{k}}} \sqrt{km} s + km} \\ &= \frac{m}{c \frac{\sqrt{m}}{\sqrt{k}}} \sqrt{k} \sqrt{m} s = \frac{mk\sqrt{k}}{c\sqrt{m}} \sqrt{k} \sqrt{m} s \\ &= \frac{mk s}{c} // \end{aligned}$$

$$\boxed{\hat{H}(s) = \frac{km}{s^2 + \frac{mk}{c} s + mk}} \rightarrow \text{forma canonica.}$$

$$\omega_d = \omega_n \sqrt{1 - \zeta^2}$$

$$\omega_d = \sqrt{mk} \sqrt{1 - \frac{mk}{4c^2}}$$

$$\omega_d = \sqrt{mk - \frac{(mk)^2}{4c^2}} //$$

$$\zeta^2 = \left( \frac{m}{2c\sqrt{\frac{m}{k}}} \right)^2$$

$$\zeta^2 = \frac{m^2}{4c^2 \frac{m}{k}}$$

$$\zeta^2 = \frac{mk}{4c^2 k}$$

$$\zeta^2 = \frac{mk}{4c^2}$$