Tutorial 6

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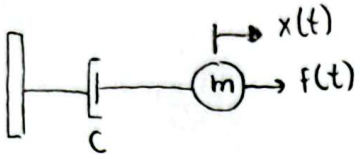
① Sistema Massa-Amortecedor



$$m\ddot{x}(t) + c\dot{x}(t) = f(t) = f_0\delta(t)$$

$$ms^2X(s) + cs\,X(s) = F_0(s)$$

$$X(s) = \frac{F_0(s)}{ms^2 + cs} \rightarrow \text{função de transferência}$$

② $$Y(s) = \frac{f_0}{s(ms+c)}\frac{1}{s} = \frac{f_0}{s^2(ms+c)}$$

③ $$m\ddot{y}(t) + Ky(t) = f(t)$$

$$ms^2X(s) + KX(s) = F(s)$$

$$X(s) = \frac{F(s)}{ms^2 + K}$$

④ $$x_0(t) = \frac{F_0}{a}\left[1 - e^{-\underset{\|}{1}\zeta\omega_n t}\left(\cos(\omega_d t) + \frac{\underset{\|}{0}\zeta\omega_n}{\omega_d}\operatorname{sen}(\omega_d t)\right)\right]$$

$\zeta = 0$ sem amortecimento

$$x_0(t) = \frac{F_0}{a}\left[1 - \cos(\omega_d t)\right]$$

$$\omega_n = \sqrt{\frac{K}{m}} = \sqrt{\frac{100\ N/m}{1Kg}} = 10\ rad/s$$

$\omega_d = \omega_n$

$$x_0(t) = \frac{10}{100}\left[1 - \cos(10t)\right]$$

$$x_0(t) = 0{,}1\left[1 - \cos(10t)\right]$$

As expressões são equivalentes, os gráficos serão idênticos.