

$$C = 0.1, m = 0.1$$

$$K_1 = K_2 = 1$$

$H(s)$ = transfer function from $F_s(t)$ to $V_m(t)$

$$= \frac{-10}{s^2 + s + 10}$$

Input $V_s(t) = 0, F_s(t) = 7 \cos(3t + \pi)$

1. Magnitude & Phase of Input

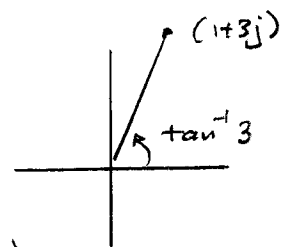
$$7 \cos(3t + \pi) = \text{Re} \left[\underbrace{7}_{\text{magnitude}} e^{j \underbrace{(3t + \pi)}_{\text{phase}}} \right]$$

2. Magnitude & Phase of $H(s)$ for this input

$$s = 3j$$

$$H(s) = \frac{-10}{(3j)^2 + 3j + 10} = \frac{-10}{1 + 3j}$$

$$= \frac{10 e^{j\pi}}{\sqrt{10} e^{j \tan^{-1} 3}} = \underbrace{\sqrt{10}}_{\text{magnitude}} e^{j(\pi - \tan^{-1} 3)} \quad \text{phase}$$



3. Magnitude of V_m = $7\sqrt{10}$

phase of V_m = $3t + \pi + \pi - \tan^{-1} 3 = 3t + 2\pi - \tan^{-1} 3$