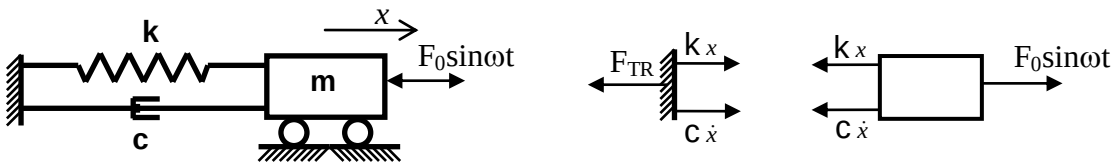
Résumé du 3ème cours : transmittance et mouvement de la fondation

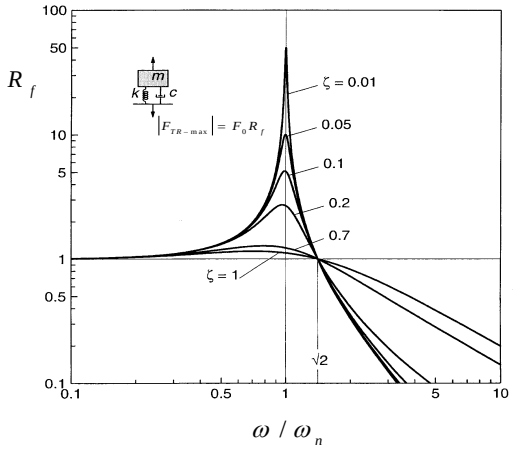


Force transmise $F_{TR}(t) = kx(t) + c\dot{x}(t) = F_0 \cdot \sin\ \omega t - m \cdot \ddot{x}(t)$ (déphasage de 90°)

Amplitude de $F_{TR}(t)$ $\left|F_{TR-\max}\right| = \sqrt{c^2 \dot{x}^2_{\max} + k^2 x^2_{\max}} = x_{\max} \cdot \sqrt{c^2 \cdot \omega^2 + k^2}$

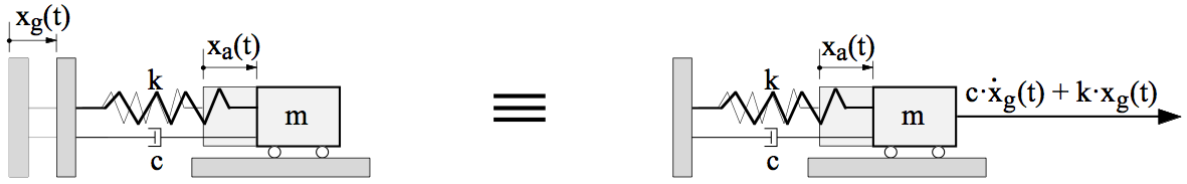
$\left|F_{TR-\max}\right| = F_0 R_f$

$$R_f = \frac{\left|F_{TR-\max}\right|}{F_0} = \frac{\sqrt{1 + 4 \cdot \zeta^2 \cdot \left(\frac{\omega}{\omega_n}\right)^2}}{\sqrt{\left(1 - \frac{\omega^2}{\omega_n^2}\right)^2 + 4 \cdot \zeta^2 \cdot \left(\frac{\omega}{\omega_n}\right)^2}} = R_d \cdot \sqrt{1 + 4 \cdot \zeta^2 \cdot \left(\frac{\omega}{\omega_n}\right)^2}$$



$$\zeta = 0 \Rightarrow R_f = R_d = \left|\frac{1}{1 - \left(\frac{\omega^2}{\omega_n^2}\right)}\right|$$

Mouvement de la fondation



Equation différentielle : $-k[x_a(t) - x_g(t)] - c[\dot{x}_a(t) - \dot{x}_g(t)] = m\ddot{x}_a(t)$

$m\ddot{x}_a + kx_a + c\dot{x}_a = c\dot{x}_g + kx_g$ (Déplacement prescrit/imposé)

$\ddot{x} + 2\zeta\omega_n \cdot \dot{x} + \omega_n^2 \cdot x = -\ddot{x}_g$ (Accélération prescrite/imposée)

Vibration harmonique $x_{\max} = x_{g0} R_f$