

③ Behavior of follow-up response, $y_p(t) = Y \sin(\omega t + \phi)$

Magnitude: $Y = \frac{E/\omega_n^2}{[(1-r^2)^2 + (2\xi r)^2]^{1/2}} \quad (14)$

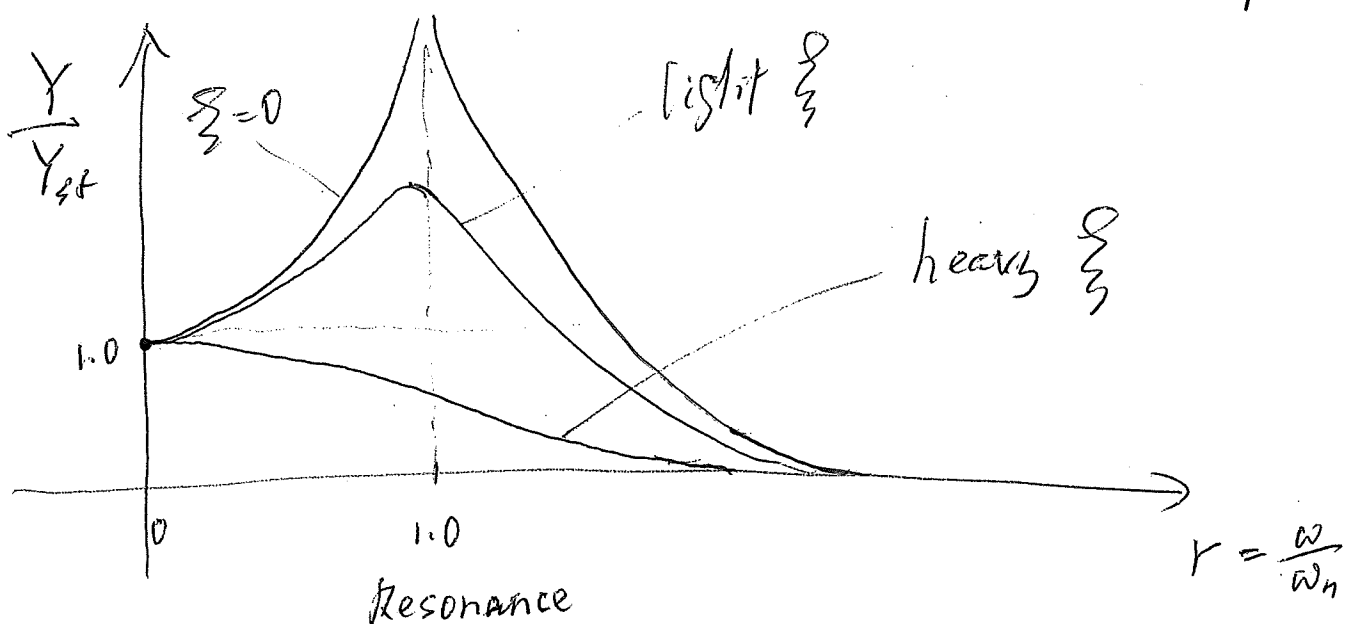
For slow excitation, $r = \frac{\omega}{\omega_n} \ll 1.0$

Eq (14) $\Rightarrow Y \approx \frac{E}{\omega_n^2} = Y_{st}$

Y is meaningfully measured in the scale of Y_{st}

Or $\boxed{\frac{Y}{Y_{st}} = \frac{1}{[(1-r^2)^2 + (2\xi r)^2]^{1/2}}}$

In chart form:



Phase lag =

$$\phi = -\tan^{-1} \frac{z \xi r}{1 - r^2} \quad (P)$$

