Assignment 1, Structural Dynamics
(May 3, 2011, Submit by May 17, 2011)

Compute response of a SDOF system subjected to a harmonic excitation based on Eq. (3.19) for the following conditions.

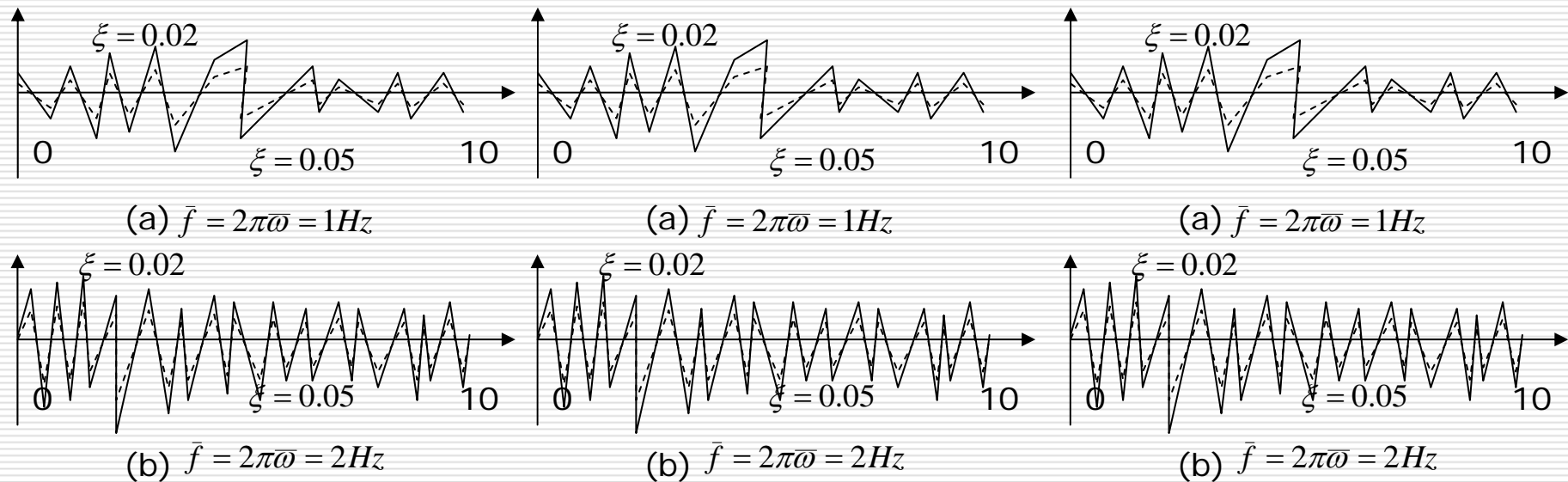- Assume that initial displacement v(t) and velocity $\dot{v}(t)$ at t=0 are zero.

- Assume that $f = \dfrac{\omega}{2\pi} = 0.5 Hz$ and

$$\bar{f} = \dfrac{\bar{\omega}}{2\pi} = 1\text{Hz and 2Hz.}$$

- Assume that damping ratio ξ is 0.02 and 0.05

● Assume p_0=100KN and k=1000kN/m.

● Compute 1) transient response displacement $v_c(t)$, 2) steady-state harmonic response displacement $v_p(t)$, and 3) general solution $v(t) = v_c(t) + v_p(t)$ for t=0-10 s with an interval of 0.1s.

● Plot the computed response like below

(a) $\bar{f} = 2\pi\bar{\omega} = 1Hz$ (a) $\bar{f} = 2\pi\bar{\omega} = 1Hz$ (a) $\bar{f} = 2\pi\bar{\omega} = 1Hz$

(b) $\bar{f} = 2\pi\bar{\omega} = 2Hz$ (b) $\bar{f} = 2\pi\bar{\omega} = 2Hz$ (b) $\bar{f} = 2\pi\bar{\omega} = 2Hz$

(1) $v_c(t)$ (2) $V_p(t)$ (3) $v(t) = v_c(t) + v_p(t)$

● Comment 1) the difference of $v_c(t)$ and $v_p(t)$, 2) the effect of $\bar{f}$, and 3) the effect of damping ratio
●Submit to Room 511 or Room 513 (Kawashima lab) by May 17, 2011

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