Assignment 1, Structural Dynamics (May 11, 2002, Submit by May 18, 2002)

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 $f = 2\pi\omega = 0.5Hz$ and $\bar{f} = 2\pi\bar{\omega}$ =1Hz and 2Hz.

• Assume that $\xi = 0.01$ and 0.05.

• Assume $p_0=100KN$ and k=1000kN/m. •Compute 1) free vibration $v_c(t)$, 2) forced excitation vibration $v_p(t)$, 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



(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 \overline{f} , and 3) the effect of damping ratio