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ENME 351

SP3 – Traditional/Laplace Methods

$$m\ddot{x} + c\dot{x} + kx = f$$
$$x(0) = x_0 \;\; and \;\; \dot{x}(0) = v_0$$

Homogenous DEM

Use Traditional method, Laplace transform method, and Linear algebra method.

Consider only (a) undamped and (b) underdamped $\xi = 0.3$ and (c) overdamped $\xi = 1.2$) (select numerical values for system parameters (*m,c,k*), initial conditions to illustrate your analysis) (explain in detail, include computer simulation results).

Case 1
f(t)=0 x(0)=x_0 v(0)=v_0

Non-Homogenous DEM

Use Traditional method and Laplace transform method

Consider: (a) undamped $\xi = 0$; (b) underdamped $\xi = 0.3$ and (c) overdamped $\xi = 1.2$)

Select numerical values for system parameters (*m,c,k*), initial conditions, step value (F_o), and forcing frequency (*w*) to illustrate your analysis) (explain in detail, include computer simulation results).

Case 2	Case 3
f(t) = F_0 x(0)=0 v(0)=0	f(t) = F_0 cos (*w*t) x(0)=0 v(0)=0