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**Quiz 7**  
**November 8, 2013**

1) Consider the following four mechanical oscillation differential equations. In each case answer the following questions:

(i) If the problem is inhomogeneous what is the undetermined coefficients "guess" for the particular solution  $x_p(t)$ ? (Do NOT try to find the precise particular solution, just its form.) If the problem is homogenous, find the homogeneous solution.

(ii) What physical phenomenon will be exhibited by the general solutions to this differential equation?

1a)  $x''(t) + 10x(t) = 0$

(2 points)

1b)  $x''(t) + 9x(t) = 4\cos(3t)$ .

(3 points)

1c)  $x''(t) + 10x(t) = 4\cos(3t)$ .

(2 points)

1d)  $x''(t) + 0.2x'(t) + 9x(t) = 4\cos(\omega t)$ ,  
with  $\omega \approx 3$ .

(3 points)