

HOMWORK 7, M 331  
DUE 4/2/09

**Problem 1.** Consider the inhomogeneous ODE

$$y'' - 6y' + 10y = f(t).$$

- (i) Solve the ODE with inhomogeneity  $f(t) = e^{3t}$  subject to the initial condition  $y(0) = 1, y'(0) = 3$ .
- (ii) Find the general solution of the ODE with inhomogeneity  $f(t) = \sin t$ .
- (iii) Find a particular solution of the ODE with inhomogeneity  $f(t) = e^{3t} \cos t$ .

**Problem 2.** Find the general solution of the inhomogeneous ODE

$$y'' + y' = 1 + e^{-t} + e^t.$$

**Problem 3.** Find a particular solution of the inhomogeneous ODE

$$y'' - 2y' + y = e^t + 3te^t + t^2.$$

**Problem 4.** Find the solution of the inhomogeneous ODE

$$y'' + 6y' + 9y = t^2$$

with initial conditions  $y(0) = y'(0) = 0$ .