Note: For full credit you must show intermediate steps in your calculations.

1. (4pts) Consider the 2nd order linear nonhomogeneous ODE given by:

$$y'' - y' - 2y = 54t\,e^{2t} - 20t.$$

Find the general solution to this problem, using the *Method of Undetermined Coefficients*. You must show your steps for finding the coefficients of the *particular solution*. (Slides 18-24)

2. (4pts) Consider the 2nd order linear nonhomogeneous ODE given by:

$$y'' + 4y' + 4y = 24te^{-2t} + 40\cos(2t).$$

Find the general solution to this problem, using the *Method of Undetermined Coefficients*. You must show your steps for finding the coefficients of the *particular solution*. (Slides 22-24)

3. (4pts) Consider the 2nd order linear nonhomogeneous ODE given by:

$$y'' + 2y' + 4y = 8te^{-2t} + 12t^2.$$

Find the general solution to this problem, using the *Method of Undetermined Coefficients*. You must show your steps for finding the coefficients of the *particular solution*. (Slides 22-24)

4. (4pts) For the following nonhomogeneous differential equation give the form of the particular solution that you would guess in using the **method of undetermined coefficients**. Include your solution to the homogeneous problem. (**DO NOT** solve for the undetermined coefficients.)

$$y'' - 2\,y' + y = 5t\,e^t\,\sin(2t) + 20t^2 e^t.$$

(Slide 24)