

Math 246, Professor David Levermore
Group Work Exercises for Discussion 6
Monday, 7 October 2019

Answers to the following exercises should be worked out on the board space for your group.
Your reasoning must be shown for full credit!

First Set of Group Work Exercises [4]

Consider the differential operator

$$L = (D^2 + 4D + 13)^2(D + 4)^3D^2.$$

- (1) Give a real general solution of $Ly = 0$.
- (2) Identify the degree, characteristic and multiplicity of the forcing for the equation

$$Lu = t^2e^{-4t}.$$

- (3) Identify the degree, characteristic and multiplicity of the forcing for the equation

$$Lv = t^5e^{-2t} \sin(3t).$$

- (4) Find a particular solution of the equation

$$Lw = 250e^t.$$

Second Set of Group Work Exercises [3]

Consider the differential equation

$$u'' + 4u' + 13u = 20te^{-t}.$$

- (1) Find a particular solution of the equation.
- (2) Find a real general solution of the equation.
- (3) Solve the initial-value problem with the initial conditions $u(0) = 3$, $u'(0) = 5$.

Third Set of Group Work Exercises [3]

Consider the differential equation

$$v'' + 4v' + 13v = 20e^{-2t} \cos(3t).$$

- (1) Find a particular solution of the equation.
- (2) Find a real general solution of the equation.
- (3) Solve the initial-value problem with the initial conditions $v(0) = 4$, $v'(0) = 5$.