

Math 246, Professor David Levermore
Group Work Exercises for Discussion 8
Monday, 21 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 [5]

Consider the differential operator

$$L = D^2 - D - 12, \quad \text{where } D = \frac{d}{dt}.$$

(This operator is from Problem 5 on Exam 2.)

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

$$Lv = 12e^{-3t}.$$

- (4) Give the undetermined coefficient form of the particular solution for the equation

$$Lv = 12e^{-3t}.$$

(Do not carry out the method, just give the form.)

- (5) Give a real general solution of the equation

$$Lv = 12e^{-3t}.$$

(Use any method that is appropriate.)

Second Set of Group Work Exercises [5]

Consider the differential equation

$$D^2u - 4Du + 20u = 12 \cos(4t) + 5 \sin(4t), \quad \text{where } D = \frac{d}{dt}.$$

(This equation is related to Problem 10 on Exam 2.)

- (1) Identify the degree, characteristic, and multiplicity of the forcing.
- (2) Put the forcing into phasor form $\text{Re}(\gamma e^{\zeta t})$. Give its phasor γ and characteristic ζ .
- (3) Give the undetermined coefficient form of the particular solution for the equation.
(Do not carry out the method, just give the form.)
- (4) Give a particular solution of the equation in phasor form $\text{Re}(\Gamma e^{\zeta t})$.
- (5) Give a real general solution of the equation. (Use any method that is appropriate.)