

Math 246, Professor David Levermore
Group Work Questions for Discussion
Monday, 29 January 2018

First Set of Group Work Questions [3]

For each of the following ordinary differential equations, give its order and state whether it is linear or nonlinear. If it is nonlinear, identify a term that makes it so.

- (1) $\frac{d^3 w}{dx^3} + w^2 \frac{dw}{dx} + e^x w = x^2;$
- (2) $\frac{d^5 y}{ds^5} = 2s \frac{d^2 y}{ds^2} + \sin(s).$

Second Set of Group Work Questions [4]

- (1) Solve the initial-value problem

$$t \frac{dx}{dt} = 2x + t^3, \quad x(1) = 0.$$

- (2) Solve the initial-value problem

$$t \frac{dx}{dt} = 2x + t^3, \quad x(-1) = 2.$$

Third Set of Group Work Questions [3]

- (1) Give the interval of definition for the solution of the initial-value problem

$$\frac{dz}{dt} + \frac{1}{t^2 - 4} z = \frac{1}{\sin(t)}, \quad z(-3) = 5.$$

- (2) Give the interval of definition for the solution of the initial-value problem

$$\frac{dz}{dt} + \frac{1}{t^2 - 4} z = \frac{1}{\sin(t)}, \quad z(1) = -3.$$