

Shepley L. Ross *Introduction to*
Ordinary Differential Equations

Chapter 1. Differential Equations and Their Solutions

1.1. Classification of Differential Equations; Their Origin and Application

Classify each of the following differential equations as ordinary or partial; state the order of each equation; and determine whether the equation is linear or nonlinear.

1.1.1. $\frac{dy}{dx} + x^2y = xe^x.$

1.1.3. $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0.$

1.1.5. $\frac{d^4 y}{dx^4} + 3 \left(\frac{d^2 y}{dx^2} \right)^5 + 5y = 0.$

1.1.7. $\frac{d^2 y}{dx^2} + y \sin x = 0.$

1.1.9. $\frac{d^6 x}{dt^6} + \left(\frac{d^4 x}{dt^4} \right) \left(\frac{d^3 x}{dt^3} \right) + x = t.$