225_MATH

Introduction to Differential Equations

Text Book: Elementary Differential Equations and Boundary Value Problems, William E. Boyce, Richard C. DiPrima, and Douglas B. Meade- John Wiley and sons, Inc. (2021)(12th edition)

Chapter 1: (Introduction)

1.3 Classification of Differential Equations.

Chapter 2: (First-Order Differential Equations)

2.1 Linear Differential Equations; Method of Integrating Factors.

2.2 Separable Differential Equations.

Note: (Give the homogeneous equation in Problem Page:40 Ex:25)

2.4 Difference between Linear and Nonlinear Differential Equations.

Note: (Give the Bernoulli equation in Problem Page:60)

2.6 Exact Differential Equations and Integrating Factors.

Orthogonal Trajectories.

Chapter 3: (Second-Order Linear Differential Equations)

3.1 Homogeneous Differential Equations with Constant Coefficients.

3.2 Solutions of Linear Homogeneous Equations; the Wronskian.

Note: Until Page 119 (Example 3.2.6 included)

3.3 Complex Roots of the characteristic Equation.

Note: (Give the Euler Equation in Problems (Exercise 25) Page 129 with Section 5.4 until Page220)

3.4 Repeated Roots; Reduction of Order.

3.5 Nonhomogeneous Equations; Method of Undetermined Coefficients.

3.6 Variation of Parameters.

Chapter 4: (Higher-Order Linear Differential Equations)

4.1 General Theory of n-th Order Linear Differential Equations.

4.2 Homogeneous Differential Equations with Constant Coefficients.

4.3 The method of Undetermined Coefficients.

Note: (Give the annihilator Method in the Problems after problem 14 Page:188)

System of Linear Differential Equations by Elimination.

Chapter 5: (Series Solutions of Second-Order Linear Equations)

5.1 Review of Power Series.

5.2 Series Solutions Near an Ordinary Point, Part I.

5.4 Euler Equations. Note: (This section will be given after section 3.3 until page 220)

Chapter 6: (The Laplace Transform)

6.1 Definition of the Laplace Transform.

6.2 Solution of Initial Value Problems.

6.3 Step Functions.

Mark Distribution

Midterm Exam 1	20%
Midterm Exam 2	20%
Tutorial	10%
Project	10%
Final Exam	40%