

MA372: Differential Equations

Baker University — Fall 2023

Course Outline

Each of the following comes from the textbook *Elementary Differential Equations and Boundary Value Problems* (Ninth Edition) by William E. Boyce and Richard C. DiPrima.

Exam 1: First Order Differential Equations

- §1.1: Some Basic Mathematical Models; Direction Fields
- §1.2: Solutions of Some Differential Equations
- §1.3: Classification of Differential Equations
- §2.1: Linear Equations; Method of Integrating Factors
- §2.2: Separable Equations
- §2.6: Exact Equations and Integrating Factors
- §2.8: The Existence and Uniqueness Theorem

Exam 2: Second Order Linear Equations

- §3.1: Homogeneous Equations with Constant Coefficients
- §3.2: Solutions of Linear Homogeneous Equations; the Wronskian
- §3.3: Complex Roots of the Characteristic Equation
- §3.4: Repeated Roots; Reduction of Order
- §3.5: Nonhomogeneous Equations; Method of Undetermined Coefficients
- §3.6: Variation of Parameters
- §5.1: Review of Power Series
- §5.2: Series Solutions Near an Ordinary Point, Part I
- §5.3: Series Solutions Near an Ordinary Point, Part II
- §5.4: Euler Equations; Regular Singular Points

Exam 3: Other Methods of Solving Ordinary Differential Equations

- §6.1: Definition of the Laplace Transform
- §6.2: Solution of Initial Value Problems
- §6.3: Step Functions
- §6.5: Impulse Functions
- §6.6: The Convolution Integral
- §7.1: The Euler or Tangent Line Method
- §7.2: The Runge-Kutta Method