

MA 36600

Ordinary Differential Equations

- §1.1 - Basic Mathematical Models; Direction fields
- §1.2 - Solutions of Some Differential Equations
- §1.3 - Classification of Differential Equations

- §2.1 - First Order Linear Equations
- §2.2 - Separable Equations
- §2.3 - Modeling With First Order Equations
- §2.4 - Differences Between Linear and Nonlinear Equations
- §2.5 - Autonomous Equations
- §2.6 - Exact Equations & Integrating Factors
- §2.7 - Numerical Approximations; Euler (Tangent Line) Method

- §3.1 - Homogeneous Equations with Constant Coefficients
- §3.2 - Solutions of Linear Homogeneous Equations; Wronskians
- §3.3 - Complex Roots of the Characteristic Equation (and review of \mathbb{C})
- §3.4 - Repeated Roots of the Characteristic Equation; Reduction of Order
- §3.5 - Nonhomogeneous Equations; Undetermined Coefficients
- §3.6 - Variation of Parameters
- §3.7 - Mechanical & Electrical Vibrations
- §3.8 - Forced Periodic Vibrations

- §4.1 - n^{th} Order Linear Equations
- §4.2 - Homogeneous Equations with Constant Coefficients
- §4.3 - Undetermined Coefficients
- §4.4 - Variation of Parameters

- §7.1 - Introduction to Systems of Differential Equations
- §7.3 - Eigenvalues and Eigenvectors
- §7.4 - Theory of First Order Linear Systems
- §7.5 - Homogeneous Linear Systems with Constant Coefficients
- §7.6 - Complex Eigenvalues (and review of \mathbb{C})
- §7.7 - Fundamental Matrices
- §7.8 - Repeated Eigenvalues
- §7.9 - Nonhomogeneous Linear Systems

- §9.1 - The Phase Plane
- §9.2 - Autonomous Systems and Stability
- §9.3 - Locally Linear Systems
- §9.4 - Competing Species
- §9.5 - Predator-Prey Equations

If time permits, then also

- §6.1 - *Definition of the Laplace Transform*
- §6.2 - *Solution of Initial Value Problems*
- §6.3 - *Step Functions and Heaviside Function*
- §6.4 - *Differential Equations with Discontinuous Forcing Functions*