MA 214 COURSE OUTLINE

1. Classification of Differential Equations

2. First Order Differential Equations

(a) Linear Equations with Variable Coefficient
(b) Separable Equations
(c) Exact Equations and Integrating Factors
(d) Existence and Uniqueness of Solutions
(e) Applications of First Order Equations

3. Second Order Linear Differential Equations

(a) Homogeneous Equations with Constant Coefficients
(b) Fundamental Solutions of Linear Homogeneous Equations
(c) Linear Independence and the Wronskian
(d) Complex Roots of the Characteristic Equation
(e) Repeated Roots of the Characteristic Equation
(f) Solution of Nonhomogeneous Equations using Method of Undetermined Coefficients
(g) Variation of Parameters Method
(h) Applications of Second Order Equations

4. Higher Order Linear Differential Equations

(a) General Theory of nth Order Linear Equations
(b) Homogeneous Equations with Constant Coefficients
(c) Method of Undetermined Coefficients

5. Series Solutions of Second Order Linear Differential Equations

(a) Series solutions near an Ordinary Point (recommended)

6. Laplace Transforms

(a) Definition of Laplace Transform
(b) Solution of Initial Value Problems using Laplace Transforms
(c) Step Functions
(d) Differential Equations with Discontinuous Forcing Functions
(e) Impulse Functions

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