MA372: Differential Equations

Baker University — Fall 2023

Exam 1: First Order Differential Equations

date	day	section	topic(s)
8/23	W	§1.1: Mathematical Models; Direction Fields	∘ direction fields ∘ equilibrium solutions ∘ basic examples
8/25	F	§1.2: Solutions of Some Differential Equations	∘ basic examples ∘ initial value problems ∘ integral curves

date	day	section	topic(s)
8/28	M	§1.3: Classification of Differential Equations	∘ ODEs versus PDEs ∘ order ∘ linearity ∘ basic examples
8/30	W	§2.1: Linear Equations; Integrating Factors	∘ first order linear equations ∘ integrating factors ∘ initial value problems
9/1	F	§2.2: Separable Equations	∘ Chain Rule for Derivatives ∘ initial value problems ∘ integral curves

date	day	section	topic(s)
9/4	M	*Labor Day*	
9/6	W	§2.6: Exact Equations	∘ potential functions ∘ solutions of exact equations ∘ integrating factors
9/8	F	§2.8: Existence and Uniqueness Theorem	∘ integral equations ∘ Picard's Method ∘ basic examples

date	day	section	topic(s)
9/11	M	Exam I Review	
9/13	W	Exam I Review	
9/15	F	Exam I	

Exam 2: Second Order Linear Equations

date	day	section	topic(s)
9/18	M	§3.1: Homogeneous Equations	∘ homogeneity ∘ linearity ∘ characteristic equation ∘ initial value problems
9/20	W	§3.2: Linear Homogeneous Equations	∘ existence and uniqueness ∘ superposition ∘ computing the Wronskian
9/22	F	§3.2: Linear Homogeneous Equations	∘ fundamental set of solutions ∘ Abel's Theorem ∘ basic examples

date	day	section	topic(s)
9/25	M	§3.3: Complex Roots of Characteristic Eq'n	∘ discriminant ∘ Euler's Formula ∘ initial value problems
9/27	W	§3.4: Repeated Roots; Reduction of Order	∘ D'Alembert's Method ∘ reduction of order
9/29	F	§3.5: Method of Undetermined Coefficients	∘ the fundamental theorem ∘ basic examples

date	day	section	topic(s)
10/2	M	§3.6: Variation of Parameters	∘ motivation ∘ basic examples
10/4	W	§3.6: Variation of Parameters	∘ the fundamental theorem ∘ further examples
10/6	F	§5.1: Review of Power Series	∘ radius of convergence ∘ interval of convergence ∘ common examples of power series ∘ change of index

date	day	section	topic(s)
10/9	M	§5.2: Series Solutions, Part I	∘ ordinary point ∘ singular point ∘ recurrence relations
10/11	W	§5.3: Series Solutions, Part II	∘ analytic functions ∘ the fundamental theorem ∘ further examples
10/13	F	*Fall Break*	

date	day	section	topic(s)
10/16	M	§5.4: Euler Equations	∘ real distinct roots ∘ real repeated roots ∘ complex roots
10/18	W	Exam II Review	
10/20	F	Exam II Review	

date	day	section	topic(s)
10/23	M	Exam II	

Exam 3: Other Methods of Solving Ordinary Differential Equations

date	day	section	topic(s)
10/25	W	§6.1: Definition of the Laplace Transform	∘ improper integration ∘ Comparison Theorem ∘ integral transforms ∘ basic examples
10/27	F	§6.1: Definition of the Laplace Transform	∘ inverse Laplace transforms ∘ further examples

date	day	section	topic(s)
10/30	M	§6.2: Solutions of Initial Value Problems	∘ further examples ∘ initial value problems
11/1	W	§6.3: Step Functions	∘ Heaviside function ∘ computing step functions ∘ inverse Laplace transforms
11/3	F	§6.5: Impulse Functions	∘ Dirac delta function ∘ basic examples

date	day	section	topic(s)
11/6	M	§6.6: The Convolution Integral	∘ properties ∘ inverse Laplace transforms ∘ initial value problems
11/8	W	§8.1: The Euler or Tangent Line Method	∘ Euler Method ∘ Backward Euler Formula ∘ basic examples
11/10	F	§8.1: The Euler or Tangent Line Method	∘ basic examples ∘ order of convergence ∘ global truncation error ∘ local truncation error ∘ round-off error

date	day	section	topic(s)
11/13	M	§8.2: The Runge-Kutta Method	◦ basic examples ◦ order of convergence ◦ local truncation error
11/15	W	Exam III Review	
11/17	F	Exam III Review	

date	day	section	topic(s)
11/20	M	Exam III	
11/22	W	*Thanksgiving Break*	
11/25	F	*Thanksgiving Break*	

Final Exam Review

date	day	section	topic(s)
11/28	M	Final Exam Review	
11/30	W	Final Exam Review	
12/1	F	Final Exam Review	

date	day	section	topic(s)
12/4	M	Final Exam Review	
12/6	W	Final Exam Review	
12/8	F	Final Exam Review	

Final Exam: DATE; TIME to TIME; LOCATION