MA372: Differential Equations

Baker University — Fall 2023

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

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*	
11/24	F	*Thanksgiving Break*	

Final Exam Review

date	day	section	topic(s)
11/27	M	Final Exam Review	
11/29	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: Tuesday, December 12 from 1:00 to 4:00 PM in Mulvane 202