

MATH 371 COURSE SUMMARY

CHAPTER 1: MATHEMATICAL PRELIMINARIES AND ERROR ANALYSIS

- Section 1.2 Review of Calculus and Taylor Series (HW1/2, Exam1, Q1/2)
- Section 1.3 Round-off Error and Computer Arithmetic (HW2, Exam1)
- Section 1.4 Errors in Scientific Computing (HW2, Exam1)

CHAPTER 2: SOLUTIONS OF EQUATIONS OF ONE VARIABLE

- Section 2.2 Bisection Method (HW3, Exam1)
- Section 2.3 Secant Method (HW3, Exam1, Q3)
- Section 2.4 Newton's Method (HW3, Exam1)
- Section 2.5 Error Analysis (and Fixed Point Methods Section 2.2 in NA Text) (HW3, Exam1, Q4)

CHAPTER 6: DIRECT METHODS FOR SOLVING LINEAR SYSTEMS

- Section 6.2 Gaussian Elimination (HW4, Exam1, Q5)
- Section 6.3 Pivoting Strategies (HW4, Exam1)
- Section 6.4 / 6.5 LU Decomposition / Least Squares (HW4, Exam1)

CHAPTER 3: INTERPOLATION AND POLYNOMIAL APPROXIMATION

- Section 3.2 Lagrange Polynomials (HW5, GHW1, Exam1, Q6)
- Section 3.3 Newton Divided Differences (HW5, GHW1, Exam2, Q7)
- Section 3.4 Hermite Interpolation (HW6, Exam2)
- Section 3.5 Spline Interpolation (HW6, GHW2, Exam2, Q8)

CHAPTER 4: NUMERICAL INTEGRATION AND DIFFERENTIATION

- Section 4.2 Basic Quadrature Rules (HW7, Exam2, Q9, Q10)
- Section 4.3 Composite Quadrature Rules (HW8, GHW3, Exam2)
- Section 4.4 Romberg Integration (HW9)
- Section 4.5 Gaussian Quadrature (HW8, GHW3)
- Section 4.6 Adaptive Quadrature (GHW4)
- Section 4.7 Multiple Integrals (HW9)
- Section 4.9 Numerical Differentiation (HW9, Q11)

CHAPTER 5: NUMERICAL SOLUTIONS OF INITIAL VALUE PROBLEMS

- Section 5.2 Taylor Methods (HW10)
- Section 5.3 Runge-Kutta Methods (HW10)
- Section 5.7 Methods for Systems of Equations (GHW5)
- Section 5.4 Multistep Methods