Final Exam Syllabus (for students of all NC sections)

from
Numerical Analysis
NINTH EDITION
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1-Error Analysis

Introduction of Numerical Computing ,
Chopping, Roundoff and truncation error ,
Absolute, relative and percentage error.
Taylor polynomial, Significant figures,
Nested Arithmetic.

2-Interpolation and Polynomial approximation

Topic 3.1 page no (124-129)
Lagrange interpolation polynomial of degree one, two and three.
Divided difference table and interpolating polynomial.
Newton Forward and Backward difference formula
Questions 1,2,5,6,13,14,19
Topic 3.3: Stirling Formula (Center difference Formula)

2- Numerical Differentiation

Topic 4.1: All the concepts covered in questions
1,2,5,6,18 and 26

3- Numerical Integration

Topic 4.3: All the concepts covered in questions 1-10
Topic 4.4: All the concepts covered in questions 1-4

4- Solving ODEs

Topic 5.2: (Euler's Method) All topics covered in question no 1-4.
RK-2 Method
Special cases of RK-2 Method Heun's and Midpoint method
RK-4 Method
All topics covered in ODE practice sheet.

5-Direct Method for solving linear system

Topic 6.5: LU decomposition (Dolittle)
Topic 6.6: Positive definite matrices, LDL^t Factorization , Crout and Cholesky method

6-Iterative Method for solving linear system
Topic 7.3: Gauss-Siedel and Jacobi's methods with L-1, L-2 and L-infinity Norm.

7-Approximating Eigen values and Eigen vectors
Topic 9.3: Power Method

8-Numerical Optimization:
Gradient Descent Algorithm (Assignment)

9-Lab Sessions
Lab Session2
Lab Session 3a
Lab Session 3b
Lab Session 4