Unit- I

Chapter 1 : Numerical Computation, Errors & Concept of root of equation 1-1 to 1-30

Syllabus :

A) Basic principle of numerical computation. Floating point algebra with normalized floating point technique, Significant digits.

Errors: Different types of errors, causes of occurrence and remedies to minimize them, Generalized error formula (Derivation and Numerical)

B) Concept of roots of an equation. Descartes' rule of signs, Intermediate value theorem, Roots of Polynomial Equations using Birge-Vieta method.

Unit- II

Syllabus :

A) Solution of Transcendental and polynomial equation using Bisection, Regula- Falsi, Newton- Raphson method for single variable and two variables.

B) Curve fitting using least square approximation – First order and second order .

Unit- III

Syllabus :

Forward, Backward, Central and Divided Difference operators, Introduction to interpolation.

A) Interpolation with equal Intervals - Newton's forward, backward interpolation formula (Derivations and numerical), Stirling's and Bessel's central difference formula (Only numerical)

B) Interpolation with unequal Intervals- Newton's divided difference formula and Lagrange's interpolation (Derivations and numerical).

Unit - IV

Syllabus :

A) Numerical Differentiation using Newton's forward and backward interpolation formula (Derivation and numerical).

B) Numerical Integration :Trapezoidal and Simpson's rules as special cases of Newton-Cote's quadrature technique for single integral. Numerical on double integrals using Trapezoidal and Simpson's 1/3 rd rule.

Unit- V

Syllabus :

A) Solution of the linear simultaneous equation: Direct methods - Gauss elimination method, the concept of pivoting – partial and complete. Gauss Jordan method, Iterative methods – Jacobi method, and Gauss-Seidel method.

B) Matrix Inversion using Gauss Jordan method.

Unit - VI

Syllabus :

A) Solution of First order Ordinary Differential Equation (ODE) using Taylor's series method, Euler's method, Modified Euler's method (Derivation and numerical). Runge-Kutta fourth order method (Numerical).

B) Solution of Second order ODE using 4th order Runge-Kutta method (Numerical)

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