

Paper XIII: Numerical Analysis

I.Errors:

Introduction, significant digits, rounding of numbers, errors, relative error and number of correct digits, general error formula. Applications of errors to the fundamental operations of arithmetic.

II. Solution of algebraic and transcendental equations:

Method of successive bisection, Method of false position, Newton-Raphson's iterative method, Aitkins Δ^2 method, Solution of system of equation: Gauss elimination method, Jacobi method, Gauss-Seidal method,

III. Finite differences:

Definition and properties of Δ , ∇ and E and relation between them, the n^{th} differences of a polynomial.

IV. Interpolation:

Newton-Gregory forward and backward interpolation formula for unequal intervals.

V. Numerical Differentiation:

Using forward and backward formulae and Newton's divided difference formula, computation of first and second derivatives.

VI. Numerical Integration:

General Quadrature formula, Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ Rules, Weddle's rule, problems there on.

VII. Solution of initial value problems:

For ordinary first order and first degree differential equation by Picard's method, Taylor's, Eulers and Eulers modified method and fourth order Runge-Kutta methods.

52Hrs

Note: Internal Marks-30

References:

1. G.Shanker Rao: Numerical analysis (New Age International Publication)
2. Sastry S.S: Numerical Ananalysis (Prentice Hall of India)
3. Scheild P: Numerical Ananalysis (Schaum Series)
4. Balaguru swamy.E: Numerical Methods (Tata Mecrew hill)
5. M.K.Jain, I.R.K. Iyengar and R.K.Jain- Numerical Methods (New Age International Pvt Ltd).