

Paper III -Computer Oriented Numerical Methods

Unit I

Computer Arithmetic : Floating point representation of numbers, arithmetic operations with normalized floating point numbers and their consequences ,error in number representation, pitfalls in computing. Iterative Methods : successive approximation, bisection method, false position, Newton Raphson method, comparison of iterative methods, Baristow's method for finding complex roots.

Unit II

Solution of simultaneous linear equations : Gauss elimination method, pivoting ill conditioned equations, refinement of solution, Gauss Seidel iterative method, comparison of direct and iterative methods.

Unit III

Solution of ordinary differential equations : Euler's method, Taylor series method, local and global error analysis, Runge-Kutta methods, predictor-corrector methods, stability of solution.

Unit IV

Interpolation and approximation : Langrange's interpolation, Polynomial interpolation, difference table, truncation error in interpolation, linear regression, polynomial fitting and other curve fitting techniques, approximation of function by Taylor series and Chebyshev series.

Unit V

Numerical differentiation and integration: Differentiation formulae based on polynomial fits, pitfalls in differentiation. Integration : trapezoidal, Simpson rules, Guassian quardature.

Suggested Books

1. Rajaraman V., Computer Oreinted Numerical Methods, Peentice Hall of India Private Limited.
2. Krishnamurhy , Computer based numerical algorithms, East West Press.