

Differentiation: Numerical methods, forward difference and central difference methods, Lagrange's interpolation method.

Integration: Newton – cotes expression for integral, trapezoidal rule, Simpson's rule, Gauss quadrature method.

Solution of Differential Equations: Taylor series method, Euler method, Runge - Kutta, predictor – corrector methods.

Roots of Equations: Polynomial equations, graphical methods, bisection, Newton – Raphson and False position methods.

Solutions of Simultaneous Equations: Elimination method for simultaneous linear equations, Gauss elimination, pivotal condensation, Gauss – Seidal iteration, Gauss Jordan and Matrix inversion methods.

Eigen Values and Vectors of Matrices: Determinant of a matrix, characteristic equation, eigen values and vectors of a matrix, power method.

Development of FORTRAN Codes for the above methods

TEXT BOOKS / REFERENCES:

1. C Xavier, *FORTRAN 77 and Numerical Methods*, New Age International Limited, 1994.
2. Rubin H Landau & Manuel Jose Paez Mejia, *Computational Physics*, John Wiley and Sons, 1997.
3. Suresh Chandra, *Computer Applications in Physics*, Narosa Publishing House, New Delhi, 2003.
4. M Hijroth Jensen, Department of Physics, University of Oslo, 2003 (Available in the web)