

MT-442 Numerical Methods

Error analysis: types of errors (relative, absolute, inherent, round off, truncation), significant digits and numerical instability, flow chart, use any computational tools to analysis the numerical solutions. linear operators: functions of operators, difference operators and the derivative operators, identities, difference equations: linear homogeneous and non-homogeneous difference equations, solution of non-linear equations: numerical methods for finding the roots of transcendental and polynomial equations (secant, newton – raphsonchebyshev and graeffe's root squaring methods), rate of convergence and stability of an iterative method, solution of linear equations: numerical methods for finding the solutions of system of linear equations (gauss-elimination, gauss-jordan elimination, triangularization, cholesky, jacobi and gauss-seidel), interpolation & curve fitting lagrange's, newton, hermit, spline, least squares approximation, (linear and non-linear curves), numerical integration & differentiation: computation of integrals using simple trapezoidal rule, 1/3thsimpson's rule, 3/8th simpson's rule, composite simpson's and trapezoidal rules, computation of solutions of differential equations using (Euler method, Euler modified method, Rungekutta method of order 4), numerical solutions of partial differential equations, optimization problem (simplex method), steepest ascent and steepest descent methods.

Recommended Books:

1. "Advance Engineering Mathematics", Erwin Kreyszig, Wiley, 10th Edition, 2011.
2. "Numerical Methods for Engineering", Chapra, McGraw-Hill, 6th Edition, 2009.
3. "Applied Numerical Analysis", Gerald, Pearson, 7th Edition, 2003.