MT-612 Applied Numerical Methods

Numerical Methods: finite difference formulas, finite difference methodology, grid generation, Richardson extrapolation, stability: ODE approximations, Stability: Courant, stability, Von Neumann test , testing differential equation routines, Numerical Methods for ODEs: analytic continuation, boundary value problems, box method, shooting method, continuation method, continued fractions , cosine method , differential algebraic equations, eigenvalue/eigenfunction problems, Euler's forward method, finite element method, Hybrid computer methods, invariant imbedding multigrid methods, parallel computer methods, predictor-corrector methods, stiff equations, integrating stochastic equations, symplectic integration, use of wavelets, weighted residual methods, Numerical Methods for PDEs: boundary element method, differential quadrature, domain decomposition, elliptic Equations: Finite Differences, Monte-Carlo Method, Relaxation, Hyperbolic Equations: Method of Characteristics, Finite Differences, lattice gas dynamics method of lines, Parabolic Equations: explicit method, implicit method, Pseudospectral Method. Available software used.