

MT-457 Numerical Computing in Finance

Numerical solution of ordinary differential equations, multistep methods, consistency & stability, convergence of multi-step methods, a low-order predictor-corrector algorithm, convergence and stability theory for multistep methods, stiff differential equations and the method of lines, boundary value problems, numerical integration deterministic quadrature, gaussian quadrature, monte-carlo integration. Different methods of partial differential equations: BVPs for 2nd order elliptic PDEs, five-point discretisation of the laplacian, finite element methods, difference methods for the heat equation, difference methods for hyperbolic equations, hyperbolic conservation laws. Iterative methods for linear systems: Matrix-splitting techniques, successive over relaxation methods.

Recommended Books:

1. "Applied Numerical Methods with Matlab for Engineering and Science", ChapraS.C, Hill-MGraw, 2004.
2. "Numerical Methods for Engineers", ChapraS.C, McGraw-Hill, 6th Edition, 2010.
3. "Numerical Methods in Finance and Economics", PailoBrandimarte, John wiley& Sons.,2nd Edition, 2006.