

Reference: <https://iitk.ac.in/math/index.php/2014-05-21-10-30-47/courses> (MTH 308)

Syllabus: Pre-requisite(s): MTH 102 / None for M.Sc. 2 yr

Approximations in Scientific computing, Error propagation and amplification, conditioning, stability and accuracy, computer arithmetic mathematical software and libraries, visualization, linear systems-existence and uniqueness, sensitivity and conditioning, Gaussian elimination, special linear systems, iterative methods, nonlinear equations, convergence rates, non-linear equations in one dimension, system of non-linear equations, eigenvalue problems, existence and uniqueness, sensitivity and conditioning, computing eigenvalues and eigenvectors, approximation and interpolation, Hermite and Spline interpolation, piecewise polynomial interpolation, numerical differentiation and integration, Chebyshev differentiation and FFT, Richardson extrapolation.

Reference material(s):

1. M Heath: Scientific Computing - An introductory Survey.
2. Kendall E. Atkinson: An Introduction to Numerical Analysis.
3. S. D. Conte & S. de Boor: Elementary Numerical Analysis: An Algorithmic Approach.
4. J. Stoer and R. Bulirsch: Introduction to Numerical Analysis

Credits: 11