

MA 701: ADVANCED ENGINEERING MATHEMATICS (3-0-0: 3)

Linear Algebra

Vector Space over C, linear independence and basis, linear Transform and matrices, eigenvalues, orthogonality; Linear systems of algebraic equations, Gauss elimination, LU factorization, Pivoting, Cholesky decomposition.

Numerical Methods

Numerical solution of ODEs: Basic Principles of Numerical Approximation of ODEs, Euler, improved Euler, Runge-Kutta method; Solution of stiff equations; Linear Multistep Methods, Accuracy, Stability; Difference Methods for BVPs, accuracy; Linear Two-Point BVPs; Nonlinear Two-Point BVPs; The Shooting Method, Ansatz Methods for BVPs. Solution of PDEs: finite difference method.

Probability Theory

Probability, Bayes Theorem, random variables, moment generating function, expectation and its properties, Markov's inequality, Chebyshev's inequality, geometric and binomial distributions.

Text Books and References

1. K. Hoffman, R. Kunze, "*Linear Algebra*", PHI Learning, 2nd edition, 2015.
2. K. Atkinson, W. Han and D. Stewart, "*Numerical Solutions of Ordinary Differential Equations*", 1st edition, Wiley, 2011.
3. E. W.Cheney, D. R. Kincaid, "*Numerical mathematics & Computing*", Cengage, 7th edition, 2013.
4. S. M. Ross, "*Introduction to Probability Models*", Elsevier, 11th edition, 2014.