

Ph.D. Course Work

Subject: Mathematics

Paper – IV Advance Course in Mathematics

Stability of the critical points (equilibrium points or fixed points or steady state solutions) of linear systems of autonomous and non-linear systems of autonomous ordinary differential equations by Eigen Value method and Liapunov's second method. Application of ordinary differential equations to population dynamics.

Solutions of Hyperbolic, Parabolic and Elliptic partial differential equations by separation of variables method and Integral transform methods. Applications of Laplace Transform to the solution of initial – boundary value problems: Solution of Heat equation, Solution of wave equation, Solution of Laplace equation.

Generalized hyper geometric function and its convergence, Whipple theorem, Dixon's theorem, Barnes contours, Meijer's G Function, Simple Properties, Simple Multiplication Theorems, Differential Equation, Applications of Generalized Hyper Geometric Functions.

Continuity and Compactness, Continuity and Connectedness, Monotonic Functions: Definition and Existence of Riemann – Stieltjes Integral, Properties of the Integral.

Linear programming problems, Inventory management problems and their solution. Transportation Problems and their Applications. Markov Chains and their Applications. Correlation and Regression Analysis. Theoretical Distribution (Binomial, Poisson, and Normal Distributions).

Books:

- Theory of Ordinary Differential Equations with Applications in Biology and Engineering by Shair Ahmad and Rama Mohana Rao, Affiliated East-West Press.
- Mathematical Biology by J.D. Murry, Springer.
- Introduction to Partial Differential Equations by K. Sankara Rao, Prentice-Hall of India.
- Rainville, E.D; Special Functions, The Macmillan Co., New York 1971.
- Integral Transforms by Vashishtha and Gupta.
- Mathai and Saxena: Generalized Hypergeometric function with Application, Statistics and physical Sciences, Springer Verlag, Heidelberg and New York, Lecture Notes No. 348, 1973.
- Principles of Mathematical Analysis by Walter Rudin.
- Foundation of Complex Analysis by S. Ponnusamy, Narosa Publishing House.
- Introduction to Operations Research (Sixth Edition) by F.S. Hitler and G.J.Lieberman Mc Graw Hill International Edition, Industrial Engineering Series, 1995.
- Operations Research by S.D. Sharma.
- Statistical Methods by S.P.Gupta

