

MT-271 Ordinary Differential Equations & Complex Variable

Ordinary Differential Equation:

Definitions (differential equation, general solution, particular solution, initial condition, boundary condition, initial, homogenous and non-homogenous differential equations), First order & first degree **D.E.**, solution of non-homogeneous linear differential equations with constant coefficients, solution of Euler differential equation, computation of particular integral of non-homogenous differential equations. With model problems.

Partial Differential Equation:

Formation of partial differential equations. Solutions of first order linear and special types of second and higher order differential equations. Homogeneous partial differential equations of order one. Lagrange's multiplier.

The Laplace Transforms:

Definitions of Laplace Transforms: Motivation and Examples; Properties and Important Theorems of Laplace Transforms: Computations of Laplace Transforms of Important Functions; Inverse Laplace Transforms and Their Properties; Applications of Laplace Transforms to ODEs.

Infinite Series:

Application of convergence tests such as comparison, Root, Ratio, Raabe's and Gauss tests on the behavior of series.

Fourier series

Introduction to Fourier series. Euler Fourier formulae, even and odd functions, application of Fourier series, Fourier transform and fast Fourier transform and properties with applications.

Complex Variable

Limit, continuity, zeros and poles of a complex function. Cauchy-Reimann equations, conformal transformation, contour integration.

Recommended Books

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| 1. Complex Analysis for
Mathematics and Engineering | John H. Mathews | 2001 |
| 2. Advance Engineering Mathematics | Erwin Kreyszig | Seven Edition |
| 3. Differential Equation A
modeling Perspective | Robert L. Barrelli | 1998 |
| 4. Introduction to Differential Equation | J. Farlaw | 1994 |
| 5. Differential Equation | G. Zill | |