DSE4-N Ordinary Differential Equations And Partial Differential Equations

1. Linear Differential Equations with constant coefficients
1.1 Constant coefficient homogeneous equations
1.2 Characteristic equations
1.2.1 distinct real roots, 1.2.2 repeated roots, 1.2.3 complex roots
1.3 Particular solution
1.4 Initial value problem
1.5 The operator 1
$f(D)$ and its evaluation for the functions xm, eax , $eaxv$, xv and the operator 1
$D2+a2$ acting on sin ax and cos ax with proofs.
2. Non -Homogeneous Linear Equations
2.1 Principle of superposition
2.2 Method of undetermined coefficients
2.3 Method of reduction of order
2.4 Method of variation of parameters.
3. Series Solutions of Linear Second Order Equations
3.1 Review the properties of power series
3.2 Series solution near an ordinary point
3.3 Regular singular points
3.4 Euler equations
4. System of Equations
4.1 Introduction to system of differential equations
4.2 linear systems: basic theory of homogeneous linear systems , constant coefficient
4.3 Homogeneous systems.
5: Introduction to Ordinary and Partial Differential Equations
5.1 Surfaces and Curves in Three Dimensions
5.2 Simultaneous Differential Equations of the First Order and the First Degree in Three Variables.
5.3 Methods of solution of $dx /P = dy/ Q = dz /R$
5.4 Pfaffian Differential Forms and Equations.
5.5 Solution of Pfaffian Differential Equations in Three Variables
6: Partial Differential Equations
6.1 Introduction to Partial Differential Equations
6.2 Origin of first order Partial Differential Equations
6.3 Linear Equations of First order equations
6.4 Integral surfaces passing through given curve
7: Second Order Partial Differential Equations
7.1 The Origin of Second Order Partial Differential Equations.
7.2 Linear Partial Differential Equations with constant coefficients.
7.3 Methods of solving Linear Partial Differential Equations
7.3.1. Solution of reducible equations
7.3.2. Solution of irreducible equations with constant coefficients
7.3.3. Rules of finding complementary functions
7.3.4. Rule of finding particular integrals
8 : Classification of Partial Differential Equations
8.1 Classification of second order partial differential equations, canonical forms
8.2 Solution of Laplace equations by separation variables methods
8.3 Solution of periodic differential equations by separation variables method
8.4 Solution of wave equation by separation variables method.