|  |  |  |
| --- | --- | --- |
| **S/N** | **CONTENTS** | **Pg.** |
| **1** | **Approximations and Errors in Computation** | **1** |
| **2** | **Solution of Algebraic and Transcendental Equations** | **13** |
|  | BRACKETING METHOD |  |
| 2.5 | Iterative Methods | 21 |
| 2.8 | Bisection Method | 26 |
| 2.9 | Regula-Falsi Method | 29 |
|  | OPEN END METHOD |  |
| 2.10 | Secant Method | 32 |
| 2.12 | Newton-Rapson Method | 38 |
| **3** | **Solution of Simultaneous Algebraic Equations** | **62** |
|  | DIRECT METHOD |  |
| 3.4(1) | Method of determinants-Cramer’s rule | 76 |
| (2) | Matrix Inversion method | 78 |
| (3) | Gauss Elimination Method | 78 |
| (4) | Gauss-Jordan method | 81 |
| (5) | Factorization method | 84 |
| 3.5 | ITERATIVE METHODS OF SOLUTION | 88 |
| (1) | Jacobi’s Iteration method | 88 |
| (2) | Gauss-Seidal iteration method | 92 |
| 4.4 | Gauss-Jordan Method | 106 |
| 4.5 | Factorization Method (DIRECT METHOD) | 107 |
| 4.11 | Power Method | 117 |
| **5** | **Empirical Laws and Curve-Fitting** | **130** |
| 5.4 | Principle of Least Squares | 135 |
| 5.6 | Fitting a curve of the type | 141 |
| **7** | **Interpolation** | **185** |
|  | INTERPOLATION WITH EQUALLY SPACED INTERVAL |  |
| 7.2 | Newton’s Forward Interpolation Formula | 186 |
| 7.3 | Newton’s Backward Interpolation Formula | 187 |
| 7.4 | Central Difference Interpolation Formulae | 194 |
| 7.7 | Stirling’s Formula | 197 |
| 7.8 | Bessel’s Formula | 197 |
| 7.11 | INTERPOLATION WITH UNEQUAL INTERVALS | 209 |
| 7.12 | Lagrange’s Interpolation Formula | 209 |
| 7.13 | Divided Differences | 214 |
| 7.14 | Newton’s Divided Difference Formula | 215 |
| 7.1(1) | Spline Interpolation | 223 |
| **8** | **Numerical Differentiation and Integration** | **233** |
| 8.4 | Numerical Integration | 247 |
| 8.5 | Newton-Cotes Quadrature Formula | 248 |
| I | Trapezoidal rule | 249 |
| II | Simpson’s one-third rule | 249 |
| III | Simpson’ three-eighth rule | 250 |
| 8.10 | Gaussian Integration | 268 |
| **10** | **Numerical Solution of Ordinary Differential Equations** | **292** |
| 10.3 | Taylor’s Series Method | 296 |
| 10.4 | Euler’s Method | 299 |
| 10.5 | Modified Euler’s Method | 291 |
| 10.6 | Runge’s Method | 306 |
| 10.7 | Runge-Kutta Method | 308 |
| 10.18 | Shooting Method | 342 |
| **11** | **Numerical Solution of Partial Differential Equations** | **346** |
| 11.3 | Finite Difference Approximations To Partial Derivatives | 348 |
| 11.4 | Elliptic Equations | 349 |
| 11.5 | Solution of Laplace Equation | 349 |
| (i) | Jacobi’s method | 351 |
| (ii) | Gauss-Seidal method | 351 |
| 11.6 | Solution of Poisson’s Equation | 359 |
| 11.7 (1) | Solution of Elliptic Equations By Relaxation Method | 363 |
| 11.9 | Solution of One-Dimensional Heat Equation | 368 |
| (1) | Schmidt method | 368 |
|  |  |  |
|  |  |  |