

Contents

	<i>Preface</i>	(I)
I	Polynomial and transcendental Equation	1-18
1.	Zero of a Polynomial	1
2.	Transcendental Equation	1
3.	Bisection Method	2
4.	Order of convergence of iterative methods	3
5.	Convergence of sequence	6
6.	Newton-Raphson Method	7
7.	Order of convergence	11
8.	Regular-Falsi Method	12
9.	Rate of convergence of false position method	13
10.	Exercise	18
II	Finite Differences	19-32
1.	Forward Difference	19
2.	Backward difference operator	22
3.	Shifting operator	24
4.	Central Difference operator	25
5.	Averaging operator	26
6.	Relation between different operators	27
7.	Relation between D and Δ	30
8.	Exercise	32

III	Interpolation	33-45
1.	Newton - Gregory Forward Interpolation	34
2.	Newton's Backward Interpolation formula	37
3.	Lagrange's Interpolation formula	40
4.	Newton's divided difference Interpolation	43
5.	Exercise	45
IV	Numerical Differentiation	46-60
1.	Newton's Forward Differentiation	46
2.	Newton's Backward Differentiation	51
3.	Stirling Formula for derivatives	53
4.	Newton's Divided Difference formula for derivatives	56
5.	Lagrange's Method for derivatives	58
6.	Exercise	59
V	Numerical Integration	61-76
1.	General quadrature formula	61
2.	Trapezoidal Rule	63
3.	Simpson's One Third Rule	65
4.	Simpson's Three eight Rule	68
5.	Weddle's Rule	70
6.	Exercise	75

VI	Initial Value Problem	77-93
1	Picard's Method	77
2	Euler's Method	78
3.	Improved Euler's Method	82
4.	Runge's Method (Second Order)	85
5.	Runge's formula (Trird Order)	86
6.	Runge-Kutta Formula (Fourth Order)	87
7.	Runge - Kutta Method for simultaneous Ist order Differential Equation	91
8.	Exercise	93
VII	System of Linear Equation	94-101
1.	Crouts - Triangularisation Method	94
2.	Gauss-Seidel Method	99
3.	Exercise	101
VIII	Solved Problems on Numerical Technique and Exercise	102-108