

CONTENTS

	Page
PART I. INITIAL VALUE PROBLEMS FOR HYPERBOLIC AND PARABOLIC DIFFERENTIAL EQUATIONS	1
1. Properly posed initial value problems	1
2. Types and characteristics	19
3. Characteristic methods for first order hyperbolic systems	31
4. Banach spaces	40
5. Stability of difference methods	55
6. Examples of stable difference methods	73
7. Inhomogeneous initial value problems.	89
8. Difference methods with positivity properties . .	97
9. Fourier transforms of difference methods.	119
10. Initial value problems in several space variables	168
11. Extrapolation methods	192
PART II. BOUNDARY VALUE PROBLEMS FOR ELLIPTIC DIFFERENTIAL EQUATIONS	207
12. Properly posed boundary value problems.	207
13. Difference methods.	229
14. Variational methods	270
15. Hermite interpolation and its application to the Ritz method	290
16. Collocation methods and boundary integral methods	317
PART III. SOLVING SYSTEMS OF EQUATIONS.	334
17. Iterative methods for solving systems of linear and nonlinear equations	334
18. Overrelaxation methods for systems of linear equations	363
19. Overrelaxation methods for systems of nonlinear equations	383
20. Band width reduction for sparse matrices.	402
21. Buneman Algorithm	417
22. The Schröder-Trottenberg reduction method	426
APPENDICES: FORTRAN PROGRAMS.	444
Appendix 0: Introduction.	444
Appendix 1: Method of Massau.	447
Appendix 2: Total implicit difference method for solving a nonlinear parabolic differential equation	459
Appendix 3: Lax-Wendroff-Richtmyer method for the case of two space variables	469
Appendix 4: Difference methods with SOR for solving the Poisson equation on nonrectangular regions	484
Appendix 5: Programs for band matrices.	503
Appendix 6: The Buneman algorithm for solving the Poisson equation.	522

	Page
BIBLIOGRAPHY	532
INDEX.	538