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	 3.12 Summary and Exercises; 4 Numerical Linear Algebra; 4.1 Condition Number; 4.2 Classical Iterative Methods 4.3 Krylov Subspace Methods4.4 Direct Methods; 4.5 Preconditioning; 4.6 Appendix: Chebyshev Polynomials; 4.7 Summary and Exercises; 5 Spectral Methods; 5.1 Trigonometric Polynomials; 5.2 Fourier Spectral Method; 5.3 Orthogonal Polynomials; 5.4 Spectral Galerkin and Spectral Tau Methods; 5.5 Spectral Collocation; 5.6 Polar Coordinates; 5.7 Neumann Problems; 5.8 Fourth-Order PDEs; 5.9 Summary and Exercises; 6 Evolutionary PDEs; 6.1 Finite Difference Schemes for Heat Equation; 6.2 Other Time Discretization Schemes; 6.3 Convection- Dominated equations; 6.4 Finite Element Scheme for Heat Equation 6.5 Spectral Collocation for Heat Equation6.6 Finite Difference Scheme for Wave Equation; 6.7 Dispersion; 6.8 Summary and Exercises; 7 Multigrid; 7.1 Introduction; 7.2 Two-Grid Method; 7.3 Practical Multigrid Algorithms; 7.4 Finite Element Multigrid; 7.5 Summary and Exercises; 8 Domain Decomposition; 8.1 Overlapping Schwarz Methods; 8.2 Orthogonal Projections; 8.3 Non-overlapping Schwarz Methods; 8.4 Substructuring Methods; 8.5 Optimal Substructuring Methods; 8.6 Summary and Exercises; 9 Infinite Domains; 9.1 Absorbing Boundary Conditions; 9.2 Dirichlet-Neumann Map; 9.3 Perfectly Matched Layer 9.4 Boundary Integral Methods9.5 Fast Multipole Method; 9.6 Summary and Exercises; 10 Nonlinear Problems; 10.1 Newton's Method; 10.2 Other Methods; 10.3 Some Nonlinear Problems; 10.1 Newton's Method; 10.5 Program Verification; 10.6 Summary and Exercises; Answers to Selected Exercises; References; Index
Sommario/riassunto	A balanced guide to the essential techniques for solving elliptic partial differential equations Numerical Analysis of Partial Differential Equations provides a comprehensive, self-contained treatment of the quantitative methods used to solve elliptic partial differential equations (PDEs), with a focus on the efficiency as well as the error of the presented methods. The author utilizes coverage of theoretical PDEs, along with the nu merical solution of linear systems and various examples and exercises, to supply readers with an introduction to the essential concepts in the num