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Autore	Francis, Pope, <1936->
Titolo	L'appel a la saintete dans le monde actuel : exhortation apostolique Gaudete et exsultate // Pape Francois
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2. Record Nr.	UNINA9910830714903321
Autore	Lui S. H (Shaun H.), <1961->
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Collana	Pure and applied mathematics : a Wiley series of texts, monographs, and tracts
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Nota di contenuto	Numerical Analysis of Partial Differential Equations; Contents; Preface; Acknowledgments; 1 Finite Difference; 1.1 Second-Order Approximation for ; 1.2 Fourth-Order Approximation for ; 1.3 Neumann Boundary Condition; 1.4 Polar Coordinates; 1.5 Curved Boundary; 1.6 Difference Approximation for 2; 1.7 A Convection-Diffusion Equation; 1.8 Appendix: Analysis of Discrete Operators; 1.9 Summary and Exercises; 2 Mathematical Theory of Elliptic PDEs; 2.1 Function Spaces; 2.2 Derivatives; 2.3 Sobolev Spaces; 2.4 Sobolev Embedding Theory; 2.5 Traces; 2.6 Negative Sobolev Spaces 2.7 Some Inequalities and Identities 2.8 Weak Solutions; 2.9 Linear Elliptic PDEs; 2.10 Appendix: Some Definitions and Theorems; 2.11 Summary and Exercises; 3 Finite Elements; 3.1 Approximate Methods of Solution; 3.2 Finite Elements in 1D; 3.3 Finite Elements in 2D; 3.4 Inverse Estimate; 3.5 L2 and Negative-Norm Estimates; 3.6 Higher-Order Elements; 3.7 A Posteriori Estimate; 3.8 Quadrilateral Elements; 3.9 Numerical Integration; 3.10 Stokes Problem; 3.11 Linear Elasticity;

3.12 Summary and Exercises; 4 Numerical Linear Algebra; 4.1 Condition Number; 4.2 Classical Iterative Methods  
4.3 Krylov Subspace Methods 4.4 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 Equation 6.6 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 Method; 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 Methods 9.5 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; 10.4 Software; 10.5 Program Verification; 10.6 Summary and Exercises; Answers to Selected Exercises; References; Index

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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 numerical solution of linear systems and various examples and exercises, to supply readers with an introduction to the essential concepts in the num

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