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Descrizione fisica	1 online resource (336 p.)
Collana	Pure and Applied Mathematics : A Wiley Series of Texts, Monographs and Tracts
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Nota di contenuto	Title Page; Copyright Page; Contents; List of Contributors; Preface; Section 1 Introduction; Chapter 1 Universality of Mathematical Models in Understanding Nature, Society, and Man-Made World; 1.1 Human Knowledge, Models, and Algorithms; 1.2 Looking into the Future from a Modeling Perspective; 1.3 What This Book Is About; 1.4 Concluding Remarks; References; Section 2 Advanced Mathematical and Computational Models in Physics and Chemistry; Chapter 2 Magnetic Vortices, Abrikosov Lattices, and Automorphic Functions; 2.1 Introduction; 2.2 The Ginzburg-Landau Equations 2.2.1 Ginzburg-Landau energy 2.2.2 Symmetries of the equations; 2.2.3 Quantization of flux; 2.2.4 Homogeneous solutions; 2.2.5 Type I and Type II superconductors; 2.2.6 Self-dual case =1 2; 2.2.7 Critical magnetic fields; 2.2.8 Time-dependent equations; 2.3 Vortices; 2.3.1 n-vortex solutions; 2.3.2 Stability; 2.4 Vortex Lattices; 2.4.1 Abrikosov lattices; 2.4.2 Existence of Abrikosov lattices; 2.4.3 Abrikosov lattices as gauge-equivariant states; 2.4.4 Abrikosov function; 2.4.5 Comments on the proofs of existence results; 2.4.6 Stability of Abrikosov lattices; 2.4.7 Functions ( ), > 0 2.4.8 Key ideas of approach to stability 2.5 Multi-Vortex Dynamics; 2.6

Conclusions; Appendix 2.A Parameterization of the equivalence classes [L]; Appendix 2.B Automorphy factors; Acknowledgments; References; Chapter 3 Numerical Challenges in a Cholesky-Decomposed Local Correlation Quantum Chemistry Framework; 3.1 Introduction; 3.2 Local MRSDCI; 3.2.1 MRSDCI; 3.2.2 Symmetric group graphical approach; 3.2.3 Local electron correlation approximation; 3.2.4 Algorithm summary; 3.3 Numerical Importance of Individual Steps; 3.4 Cholesky Decomposition; 3.5 Transformation of the Cholesky Vectors
3.6 Two-Electron Integral Reassembly 3.7 Integral and Execution Buffer; 3.8 Symmetric Group Graphical Approach; 3.9 Summary and Outlook; Acknowledgments; References; Chapter 4 Generalized Variational Theorem in Quantum Mechanics; 4.1 Introduction; 4.2 First Proof; 4.3 Second Proof; 4.4 Conclusions; Acknowledgments; References; Section 3 Mathematical and Statistical Models in Life and Climate Science Applications; Chapter 5 A Model for the Spread of Tuberculosis with Drug-Sensitive and Emerging Multidrug-Resistant and Extensively Drug-Resistant Strains; 5.1 Introduction; 5.1.1 Model formulation
5.1.2 Mathematical Analysis 5.1.2.1 Basic properties of solutions; 5.1.2.2 Nature of the disease-free equilibrium; 5.1.2.3 Local asymptotic stability of the DFE; 5.1.2.4 Existence of subthreshold endemic equilibria; 5.1.2.5 Global stability of the DFE when the bifurcation is "forward"; 5.1.2.6 Strain-specific global stability in "forward" bifurcation cases; 5.2 Discussion; References; Chapter 6 The Need for More Integrated Epidemic Modeling with Emphasis on Antibiotic Resistance; 6.1 Introduction; 6.2 Mathematical Modeling of Infectious Diseases
6.3 Antibiotic Resistance, Behavior, and Mathematical Modeling

Sommario/riassunto

Illustrates the application of mathematical and computational modeling in a variety of disciplines With an emphasis on the interdisciplinary nature of mathematical and computational modeling, Mathematical and Computational Modeling: With Applications in the Natural and Social Sciences, Engineering, and the Arts features chapters written by well-known, international experts in these fields and presents readers with a host of state-of-the-art achievements in the development of mathematical modeling and computational experiment methodology. The book is a valuable guide to the methods, ideas,

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Autore	COBLIN, W.S.
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