

1. Record Nr.	UNINA9910778138403321
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Titolo	Elliptic partial differential equations and quasiconformal mappings in the plane [[electronic resource] /] / Kari Astala, Tadeusz Iwaniec, and Gaven Martin
Pubbl/distr/stampa	Princeton, : Princeton University Press, c2009
ISBN	1-282-15727-2 9786612157271 1-4008-3011-7
Edizione	[Course Book]
Descrizione fisica	1 online resource (696 p.)
Collana	Princeton mathematical series ; ; 48
Classificazione	SK 560
Altri autori (Persone)	IwaniecTadeusz MartinGaven
Disciplina	515/.93
Soggetti	Differential equations, Elliptic Quasiconformal mappings
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 647-670) and index.
Nota di contenuto	Frontmatter -- Contents -- Preface -- Chapter 1. Introduction -- Chapter 2. A Background In Conformal Geometry -- Chapter 3. The Foundations Of Quasiconformal Mappings -- Chapter 4. Complex Potentials -- Chapter 5. The Measurable Riemann Mapping Theorem: The Existence Theory Of Quasiconformal Mappings -- Chapter 6. Parameterizing General Linear Elliptic Systems -- Chapter 7. The Concept Of Ellipticity -- Chapter 8. Solving General Nonlinear First-Order Elliptic Systems -- Chapter 9. Nonlinear Riemann Mapping Theorems -- Chapter 10. Conformal Deformations And Beltrami Systems -- Chapter 11. A Quasilinear Cauchy Problem -- Chapter 12. Holomorphic Motions -- Chapter 13. Higher Integrability -- Chapter 14. Lp-Theory Of Beltrami Operators -- Chapter 15. Schauder Estimates For Beltrami Operators -- Chapter 16. Applications To Partial Differential Equations -- Chapter 17. PDEs Not Of Divergence Type: Pucci'S Conjecture -- Chapter 18. Quasiconformal Methods In Impedance Tomography: Calderón's Problem -- Chapter 19. Integral Estimates For The Jacobian -- Chapter 20. Solving The Beltrami Equation: Degenerate Elliptic Case -- Chapter 21. Aspects Of The

Sommario/riassunto

This book explores the most recent developments in the theory of planar quasiconformal mappings with a particular focus on the interactions with partial differential equations and nonlinear analysis. It gives a thorough and modern approach to the classical theory and presents important and compelling applications across a spectrum of mathematics: dynamical systems, singular integral operators, inverse problems, the geometry of mappings, and the calculus of variations. It also gives an account of recent advances in harmonic analysis and their applications in the geometric theory of mappings. The book explains that the existence, regularity, and singular set structures for second-order divergence-type equations--the most important class of PDEs in applications--are determined by the mathematics underpinning the geometry, structure, and dimension of fractal sets; moduli spaces of Riemann surfaces; and conformal dynamical systems. These topics are inextricably linked by the theory of quasiconformal mappings. Further, the interplay between them allows the authors to extend classical results to more general settings for wider applicability, providing new and often optimal answers to questions of existence, regularity, and geometric properties of solutions to nonlinear systems in both elliptic and degenerate elliptic settings.
