

1. Record Nr.	UNINA9910254075003321
Autore	Bucur Claudia
Titolo	Nonlocal diffusion and applications // by Claudia Bucur, Enrico Valdinoci
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2016
ISBN	3-319-28739-7
Edizione	[1st ed. 2016.]
Descrizione fisica	1 online resource (165 p.)
Collana	Lecture Notes of the Unione Matematica Italiana, , 1862-9113 ; ; 20
Disciplina	515.53
Soggetti	Partial differential equations Calculus of variations Integral transforms Operational calculus Functional analysis Partial Differential Equations Calculus of Variations and Optimal Control; Optimization Integral Transforms, Operational Calculus Functional Analysis
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.
Nota di contenuto	Preface; Acknowledgments; Contents; Introduction; 1 A Probabilistic Motivation; 1.1 The Random Walk with Arbitrarily Long Jumps; 1.2 A Payoff Model; 2 An Introduction to the Fractional Laplacian; 2.1 Preliminary Notions; 2.2 Fractional Sobolev Inequality and Generalized Coarea Formula; 2.3 Maximum Principle and Harnack Inequality; 2.4 An s-Harmonic Function; 2.5 All Functions Are Locally s-Harmonic Up to a Small Error; 2.6 A Function with Constant Fractional Laplacian on the Ball; 3 Extension Problems; 3.1 Water Wave Model; 3.1.1 Application to the Water Waves; 3.2 Crystal Dislocation 3.3 An Approach to the Extension Problem via the Fourier Transform 4 Nonlocal Phase Transitions; 4.1 The Fractional Allen-Cahn Equation; 4.2 A Nonlocal Version of a Conjecture by De Giorgi; 5 Nonlocal Minimal Surfaces; 5.1 Graphs and s-Minimal Surfaces; 5.2 Non-existence of Singular Cones in Dimension 2; 5.3 Boundary Regularity; 6

A Nonlocal Nonlinear Stationary Schrödinger Type Equation; 6.1 From the Nonlocal Uncertainty Principle to a Fractional Weighted Inequality; A Alternative Proofs of Some Results; A.1 Another Proof of Theorem 2.4.1; A.2 Another Proof of Lemma 2.3; References

Sommario/riassunto

Working in the fractional Laplace framework, this book provides models and theorems related to nonlocal diffusion phenomena. In addition to a simple probabilistic interpretation, some applications to water waves, crystal dislocations, nonlocal phase transitions, nonlocal minimal surfaces and Schrödinger equations are given. Furthermore, an example of an s -harmonic function, its harmonic extension and some insight into a fractional version of a classical conjecture due to De Giorgi are presented. Although the aim is primarily to gather some introductory material concerning applications of the fractional Laplacian, some of the proofs and results are new. The work is entirely self-contained, and readers who wish to pursue related subjects of interest are invited to consult the rich bibliography for guidance.
