

1. Record Nr.	UNINA9910686790303321
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Titolo	Dual Variational Approach to Nonlinear Diffusion Equations // by Gabriela Marinoschi
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Birkhäuser, , 2023
ISBN	9783031245831 9783031245824
Edizione	[1st ed. 2023.]
Descrizione fisica	1 online resource (223 pages)
Collana	PNLDE Subseries in Control, , 2731-7374 ; ; 102
Disciplina	260 515.355
Soggetti	Differential equations System theory Control theory Operator theory Mathematical optimization Calculus of variations Differential Equations Systems Theory, Control Operator Theory Calculus of Variations and Optimization Equacions diferencials no lineals Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction -- Nonlinear Diffusion Equations with Slow and Fast Diffusion -- Weakly Coercive Nonlinear Diffusion Equations -- Nonlinear Diffusion Equations with a Noncoercive Potential -- Nonlinear Parabolic Equations in Divergence Form with Wentzell Boundary Conditions -- A Nonlinear Control Problem in Image Denoising -- An Optimal Control Problem for a Phase Transition Model -- Appendix -- Bibliography -- Index.
Sommario/riassunto	This monograph explores a dual variational formulation of solutions to nonlinear diffusion equations with general nonlinearities as null

minimizers of appropriate energy functionals. The author demonstrates how this method can be utilized as a convenient tool for proving the existence of these solutions when others may fail, such as in cases of evolution equations with nonautonomous operators, with low regular data, or with singular diffusion coefficients. By reducing it to a minimization problem, the original problem is transformed into an optimal control problem with a linear state equation. This procedure simplifies the proof of the existence of minimizers and, in particular, the determination of the first-order conditions of optimality. The dual variational formulation is illustrated in the text with specific diffusion equations that have general nonlinearities provided by potentials having various stronger or weaker properties. These equations can represent mathematical models to various real-world physical processes. Inverse problems and optimal control problems are also considered, as this technique is useful in their treatment as well.

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