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Nota di contenuto	Chapter 1. Variational Problems — A Brief Retrospective -- Chapter 2. Strongly Indefinite Problems — Examples and Motivations -- Chapter

3. Localized Energy Estimates for Strongly Indefinite Functionals --
Chapter 4. Semiclassical Standing Waves of Nonlinear Dirac Equations
-- Chapter 5. Effect of External Potentials in a Coupled System
Reaction-Diffusion -- Chapter 6. The Spinorial Brezis-Nirenberg
Problem -- Chapter 7. Isometrically Embedded Sphere with Prescribed
Mean Curvature -- Chapter 8. Further Problems with Strongly Indefinite
Structures.

Sommario/riassunto

Several important problems arising in Physics, Differential Geometry and other topics lead to consider semilinear variational equations of strongly indefinite type and a great deal of work has been devoted to their study. From the mathematical point of view, the main interest relies on the fact that the tools of Nonlinear Functional Analysis, based on compactness arguments and non-degenerate structure, in general cannot be used, at least in a straightforward way, and some new techniques have to be developed. This book discusses some new abstract methods together with their applications to several localization problems, whose common feature is to involve semilinear partial differential equations with a strongly indefinite structure. This book deals with a variety of partial differential equations, including nonlinear Dirac equation from quantum physics (which is of first order), coupled system of multi-component incongruent diffusion and spinorial Yamabe type equations on spin manifolds. The unified framework in this book covers not only the existence of solutions to these PDEs problems, but also asymptotic behaviors of these solutions. In particular, the results for the nonlinear Dirac equations show several concentration behaviors of semiclassical standing waves under the effect of external potentials and the results for the spinorial Yamabe type equations show the existence of conformal embeddings of the 2-sphere into Euclidean 3-space with prescribed mean curvature. This book will be appealing to a variety of audiences including researchers, postdocs, and advanced graduate students who are interested in strongly indefinite problems.
