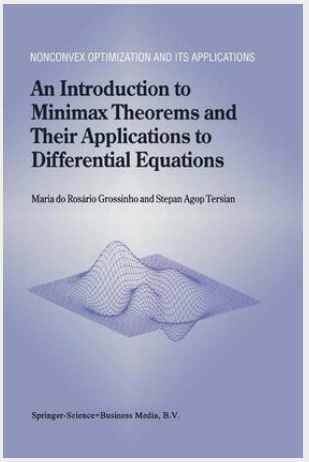
Tersian / do Rosário Grossinho

An Introduction to Minimax Theorems and Their Applications to Differential Equations



This text is meant to be an introduction to critical point theory and its ap plications to differential equations. It is designed for graduate and postgrad uate students as well as for specialists in the fields of differential equations, variational methods and optimization. Although related material can be the treatment here has the following main purposes: found in other books, • To present a survey on existing minimax theorems, • To give applications to elliptic differential equations in bounded do mains and periodic second-order ordinary differential equations, • To consider the dual variational method for problems with continuous and discontinuous nonlinearities, • To present some elements of critical point theory for locally Lipschitz functionals and to give applications to fourth-order differential equa tions with discontinuous nonlinearities, • To study homo clinic solutions of differential equations via the varia tional method. The Contents of the book consist of seven chapters, each one divided into several sections. A bibliography is attached to the end of each chapter. In Chapter I, we present minimization theorems and the mountain-pass theorem of Ambrosetti-Rabinowitz and some of its extensions. The con cept of differentiability of mappings in Banach spaces, the Fnkhet's and Gateaux derivatives, second-order derivatives and general minimization the orems, variational principles of Ekeland [Ekl] and Borwein & Preiss [BP] are proved and relations to the minimization problem are given. Deformation lemmata, Palais-Smale conditions and mountain-pass theorems are consid ered.

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