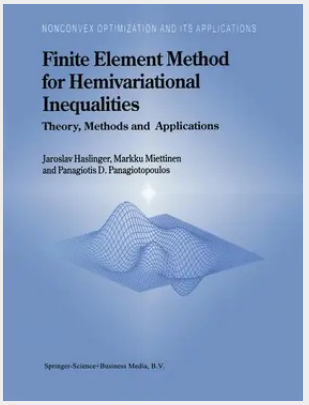
Haslinger / Miettinen / Panagiotopoulos

Finite Element Method for Hemivariational Inequalities

Theory, Methods and Applications



Hemivariational inequalities represent an important class of problems in nonsmooth and nonconvex mechanics. By means of them, problems with nonmonotone, possibly multivalued, constitutive laws can be formulated, mathematically analyzed and finally numerically solved. The present book gives a rigorous analysis of finite element approximation for a class of hemivariational inequalities of elliptic and parabolic type. Finite element models are described and their convergence properties are established. Discretized models are numerically treated as nonconvex and nonsmooth optimization problems. The book includes a comprehensive description of typical representants of nonsmooth optimization methods. Basic knowledge of finite element mathematics, functional and nonsmooth analysis is needed. The book is self-contained, and all necessary results from these disciplines are summarized in the introductory chapter. : Engineers and applied mathematicians at universities and working in industry. Also graduate-level students in advanced nonlinear computational mechanics, mathematics of finite elements and approximation theory. Chapter 1 includes the necessary prerequisite materials.

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