Kummer / Klatte

Nonsmooth Equations in Optimization

Regularity, Calculus, Methods and Applications

Many questions dealing with solvability, stability and solution methods for va- ational inequalities or equilibrium, optimization and complementarity problems lead to the analysis of certain (perturbed) equations. This often requires a - formulation of the initial model being under consideration. Due to the specific of the original problem, the resulting equation is usually either not differ- tiable (even if the data of the original model are smooth), or it does not satisfy the assumptions of the classical implicit function theorem. This phenomenon is the main reason why a considerable analytical inst- ment dealing with generalized equations (i.e., with finding zeros of multivalued mappings) and nonsmooth equations (i.e., the defining functions are not c- tinuously differentiable) has been developed during the last 20 years, and that under very different viewpoints and assumptions. In this theory, the classical hypotheses of convex analysis, in particular, monotonicity and convexity, have been weakened or dropped, and the scope of possible applications seems to be quite large. Briefly, this discipline is often called nonsmooth analysis, sometimes also variational analysis. Our book fits into this discipline, however, our main intention is to develop the analytical theory in close connection with the needs of applications in optimization and related subjects. Main Topics of the Book 1. Extended analysis of Lipschitz functions and their generalized derivatives, including "Newton maps" and regularity of multivalued mappings. 2. Principle of successive approximation under metric regularity and its - plication to implicit functions.

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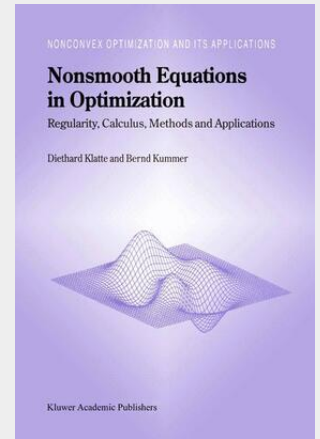
160,49 €
149,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9781441952189
Medium: Buch
ISBN: 978-1-4419-5218-9
Verlag: Springer US
Erscheinungstermin: 07.12.2010
Sprache(n): Englisch
Auflage: 1. Auflage. Softcover version of original hardcover Auflage 2002
Serie: Nonconvex Optimization and Its Applications
Produktform: Kartoniert
Gewicht: 552 g
Seiten: 333
Format (B x H): 155 x 235 mm