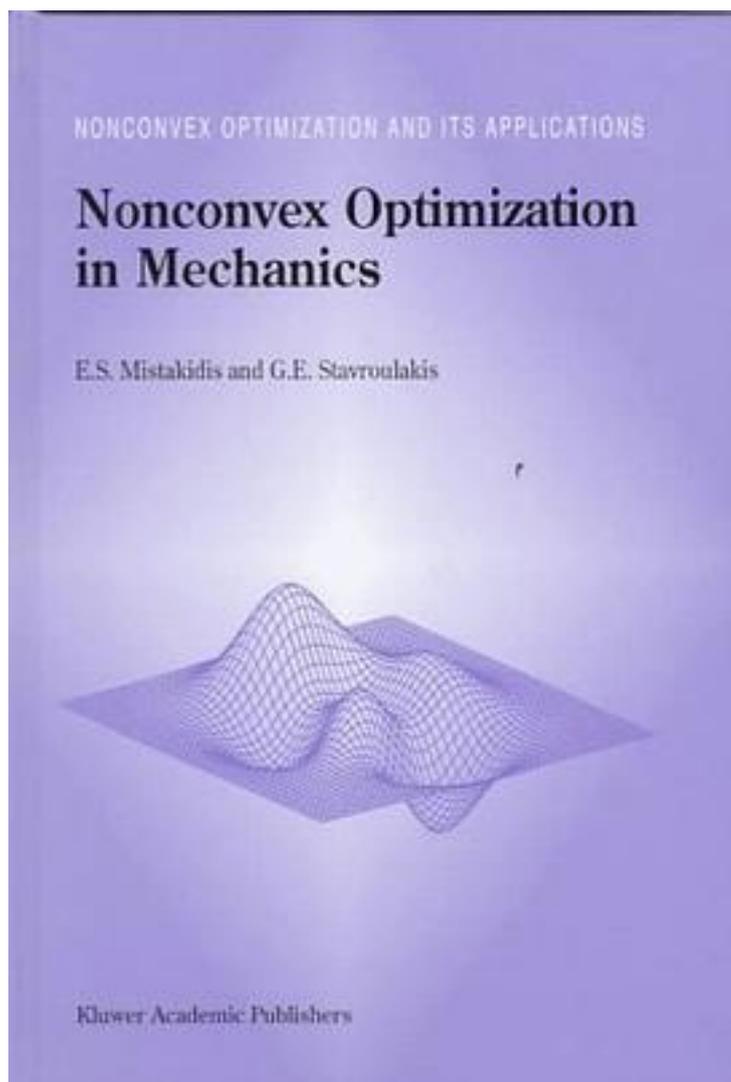# Nonconvex Optimization in Mechanics

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著者:Mistakidis, E. S./ Stavroulakis, Georgios E.

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This book presents, in a comprehensive way, the application of optimization algorithms and heuristics in engineering problems involving smooth and nonsmooth energy potentials. These problems arise in real-life modeling of civil engineering and engineering mechanics applications. Engineers will gain an insight into the theoretical justification of their methods and will find numerous extensions of the classical tools proposed for the treatment of novel applications with significant practical importance. Applied mathematicians and software developers will find a rigorous discussion of the links between applied optimization and mechanics which will enhance the interdisciplinary development of new methods and techniques. Among the large number of concrete applications are unilateral frictionless, frictional or adhesive contact problems, and problems involving complicated friction laws and interface geometries which are treated by the application of fractal geometry. Semi-rigid connections in civil engineering structures, a topic recently introduced by design specification codes, complete analysis of composites, and innovative topics on elastoplasticity, damage and optimal design are also represented in detail. Audience: The book will be of interest to researchers in mechanics, civil, mechanical and aeronautical engineers, as well as applied mathematicians. It is suitable for advanced undergraduate and graduate courses in computational mechanics, focusing on nonlinear and nonsmooth applications, and as a source of examples for courses in applied optimization.

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