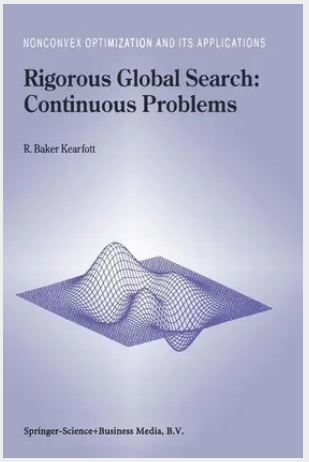
Kearfott

Rigorous Global Search: Continuous Problems



This work grew out of several years of research, graduate seminars and talks on the subject. It was motivated by a desire to make the technology accessible to those who most needed it or could most use it. It is meant to be a self-contained introduction, a reference for the techniques, and a guide to the literature for the underlying theory. It contains pointers to fertile areas for future research. It also serves as introductory documentation for a Fortran 90 software package for nonlinear systems and global optimization. The subject of the monograph is deterministic, automatically verified or r- orous methods. In such methods, directed rounding and computational fix- point theory are combined with exhaustive search (branch and bound) te- niques. Completion of such an algorithm with a list of solutions constitutes a rigorous mathematical proof that all of the solutions within the original search region are within the output list. The monograph is appropriate as an introduction to research and technology in the area, as a desk reference, or as a graduate-level course reference. Kno- edge of calculus, linear algebra, and elementary numerical analysis is assumed.

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