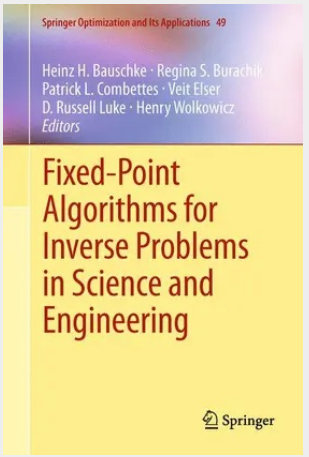
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Fixed-Point Algorithms for Inverse Problems in Science and Engineering



"Fixed-Point Algorithms for Inverse Problems in Science and Engineering" presents some of the most recent work from top-notch researchers studying projection and other first-order fixed-point algorithms in several areas of mathematics and the applied sciences. The material presented provides a survey of the state-of-the-art theory and practice in fixed-point algorithms, identifying emerging problems driven by applications, and discussing new approaches for solving these problems.

This book incorporates diverse perspectives from broad-ranging areas of research including, variational analysis, numerical linear algebra, biotechnology, materials science, computational solid-state physics, and chemistry.

Topics presented include:

Theory of Fixed-point algorithms: convex analysis, convex optimization, subdifferential calculus, nonsmooth analysis, proximal point methods, projection methods, resolvent and related fixed-point theoretic methods, and monotone operator theory.

Numerical analysis of fixed-point algorithms: choice of step lengths, of weights, of blocks for block-iterative and parallel methods, and of relaxation parameters; regularization of ill-posed problems; numerical comparison of various methods.

Areas of Applications: engineering (image and signal reconstruction and decompression problems), computer tomography and radiation treatment planning (convex feasibility problems), astronomy (adaptive optics), crystallography (molecular structure reconstruction), computational chemistry (molecular structure simulation) and other areas.

Because of the variety of applications presented, this book can easily serve as a basis for new and innovated research and collaboration.

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