Fixed Point Theory and Graph Theory

Description: Fixed Point Theory and Graph Theory provides an intersection between the theories of fixed point theorems that give the conditions under which maps (single or multivalued) have solutions and graph theory which uses mathematical structures to illustrate the relationship between ordered pairs of objects in terms of their vertices and directed edges.

This edited reference work is perhaps the first to provide a link between the two theories, describing not only their foundational aspects, but also the most recent advances and the fascinating intersection of the domains.

The authors provide solution methods for fixed points in different settings, with two chapters devoted to the solutions method for critically important non-linear problems in engineering, namely, variational inequalities, fixed point, split feasibility, and hierarchical variational inequality problems. The last two chapters are devoted to integrating fixed point theory in spaces with the graph and the use of retractions in the fixed point theory for ordered sets.

- Introduces both metric fixed point and graph theory in terms of their disparate foundations and common application environments
- Provides a unique integration of otherwise disparate domains that aids both students seeking to understand either area and researchers interested in establishing an integrated research approach
- Emphasizes solution methods for fixed points in non-linear problems such as variational inequalities, split feasibility, and hierarchical variational inequality problems that is particularly appropriate for engineering and core science applications

Contents:

- Introduction to Caristi Operator Theory
- Iterative Approximation of Fixed Points of Almost Contractions
- Approximate Fixed Points of Mappings
- Viscosity Method for Some Applied Nonlinear Analysis Problems
- Extragradient Method for Some Nonlinear Problems
- Iterative Methods for Nonexpansive Type Mappings
- Metric Fixed Point Theory in Spaces with a Graph
- The Use of Retractions in the Fixed Point Theory for Ordered Sets

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