

1. Record Nr.	UNINA9910143750403321
Autore	Adeli Hojjat <1950->
Titolo	Cost optimization of structures [[electronic resource]] : fuzzy logic, genetic algorithms, and parallel computing / / Hojjat Adeli, Kamal C. Sarma
Pubbl/distr/stampa	Chichester, England ; ; Hoboken, NJ, : Wiley, c2006
ISBN	1-280-72221-5 9786610722211 0-470-30045-0 0-470-86735-3 0-470-86734-5
Descrizione fisica	1 online resource (223 p.)
Altri autori (Persone)	SarmaKamal C <1955-> (Kamal Chandra)
Disciplina	620.00450151 721/.042
Soggetti	Structural optimization - Mathematics Skyscrapers - Design and construction - Cost control
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. [185]-199) and index.
Nota di contenuto	Cost Optimization of Structures; Contents; Preface; Acknowledgments; About the Authors; 1 Introduction; 1.1 The Case for Cost Optimization; 1.2 Cost Optimization of Concrete Structures; 1.2.1 Concrete Beams and Slabs; 1.2.2 Concrete Columns; 1.2.3 Concrete Frame Structures; 1.2.4 Bridge Structures; 1.2.5 Water Tanks; 1.2.6 Folded Plates and Shear Walls; 1.2.7 Concrete Pipes; 1.2.8 Concrete Tensile Members; 1.2.9 Cost Optimization Using the Reliability Theory; 1.2.10 Concluding Comments; 1.3 Cost Optimization of Steel Structures; 1.3.1 Deterministic Cost Optimization 1.3.2 Cost Optimization Using the Reliability Theory 1.3.3 Fuzzy Optimization; 1.3.4 Concluding Comments; 2 Evolutionary Computing and the Genetic Algorithm; 2.1 Overview and Basic Operations; 2.2 Coding and Decoding; 2.3 Basic Operations in Genetic Algorithms; 2.4 GA with the Penalty Function Method; 2.4.1 Problem Formulation for Axial Force (Truss) Structures; 2.4.2 Genetic Algorithm with the Penalty Function Method; 2.5 Augmented Lagrangian Method; 2.6 GA with the

Augmented Lagrangian Method; 2.6.1 Problem Formulation for Axial Force (Truss) Structures
2.6.2 Genetic Algorithm with the Augmented Lagrangian Method3 Cost Optimization of Composite Floors; 3.1 Introduction; 3.2 Minimum Cost Design of Composite Beams; 3.2.1 Cost Function; 3.2.2 Constraints; 3.2.3 Problem Formulation as a Mixed Integer-Discrete Nonlinear Programming Problem; 3.3 Solution by the Floating-Point Genetic Algorithm; 3.3.1 Binary Versus Floating-Point GA; 3.3.2 Crossover Operation for the Floating-Point GA; 3.3.3 Mutation Operation for the Floating-Point GA; 3.3.4 Floating-Point GA for Cost Optimization of Composite Floors; 3.4 Solution by the Neural Dynamics Method
3.5 Counter Propagation Neural (CPN) Network for Function Approximations3.6 Examples; 3.6.1 Example 1; 3.6.2 Example 2; 4 Fuzzy Genetic Algorithm for Optimization of Steel Structures; 4.1 Introduction; 4.2 Fuzzy Set Theory and Structural Optimization; 4.3 Minimum Weight Design of Axially Loaded Space Structures; 4.4 Fuzzy Membership Functions; 4.5 Fuzzy Augmented Lagrangian Genetic Algorithm; 4.6 Implementation and Examples; 4.6.1 Example 1; 4.6.2 Example 2; 4.7 Conclusion; 5 Fuzzy Discrete Multi-criteria Cost Optimization of Steel Structures; 5.1 Cost of a Steel Structure5.3 Fuzzy Discrete Multi-criteria Cost Optimization; 5.4 Membership Functions; 5.4.1 Membership Function for Minimum Cost; 5.4.2 Membership Function for Minimum Weight; 5.4.3 Membership Function for Minimum Number of Section Types; 5.5 Fuzzy Membership Functions for Criteria with Unequal Importance; 5.6 Pareto Optimality; 5.7 Selection of Commercially Available Discrete Shapes; 5.8 Implementation and a Parametric Study; 5.9 Application to High-Rise Steel Structures; 5.9.1 Example 1; 5.9.2 Example 2; 5.10 Concluding Comments
6 Parallel Computing

Sommario/riassunto

While the weight of a structure constitutes a significant part of the cost, a minimum weight design is not necessarily the minimum cost design. Little attention in structural optimization has been paid to the cost optimization problem, particularly of realistic three-dimensional structures. Cost optimization is becoming a priority in all civil engineering projects, and the concept of Life-Cycle Costing is penetrating design, manufacturing and construction organizations. In this groundbreaking book the authors present novel computational models for cost optimization of large scale, realistic
