1. Record Nr. UNINA9910786845303321

Autore	Simon Dan <1960->
Titolo	Evolutionary optimization algorithms [[electronic resource]] : biologically-Inspired and population-based approaches to computer intelligence / / Dan Simon
Pubbl/distr/stampa	Hoboken, NJ, : John Wiley & Sons Inc., 2013
ISBN	1-118-65956-2 1-118-65950-3
Descrizione fisica	1 online resource (776 p.)
Classificazione	MAT008000
Disciplina	006.3
Soggetti	Evolutionary computation Computer algorithms Biologically-inspired computing
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. 685-726) and index.
Nota di contenuto	Cover; Title Page; Copyright Page; SHORT TABLE OF CONTENTS; DETAILED TABLE OF CONTENTS; Acknowledgments; Acronyms; List of Algorithms; PART I INTRODUCTION TO EVOLUTIONARY OPTIMIZATION; 1 Introduction; 1.1 Terminology; 1.2 Why Another Book on Evolutionary Algorithms?; 1.3 Prerequisites; 1.4 Homework Problems; 1.5 Notation; 1.6 Outline of the Book; 1.7 A Course Based on This Book; 2 Optimization; 2.1 Unconstrained Optimization; 2.2 Constrained Optimization; 2.3 Multi-Objective Optimization; 2.4 Multimodal Optimization; 2.5 Combinatorial Optimization; 2.6 Hill Climbing 2.6.1 Biased Optimization Algorithms2.6.2 The Importance of Monte Carlo Simulations; 2.7 Intelligence; 2.7.1 Adaptation; 2.7.2 Randomness; 2.7.3 Communication; 2.7.4 Feedback; 2.7.5 Exploration and Exploitation; 2.8 Conclusion; Problems; PART II CLASSIC EVOLUTIONARY ALGORITHMS; 3 Genetic Algorithms; 3.1 The History of Genetics; 3.1.1 Charles Darwin; 3.1.2 Gregor Mendel; 3.2 The Science of Genetics; 3.3 The History of Genetic Algorithms; 3.4 A Simple Binary Genetic Algorithm; 3.4.1 A Genetic Algorithm for Robot Design; 3.4.2 Selection and Crossover; 3.4.3 Mutation; 3.4.4 GA Summary 3.4.5 GA Tuning Parameters and Examples3.5 A Simple Continuous Genetic Algorithm; 3.6 Conclusion; Problems; 4 Mathematical Models of

Genetic Algorithms; 4.1 Schema Theory; 4.2 Markov Chains; 4.3 Markov Model Notation for Evolutionary Algorithms; 4.4 Markov Models of Genetic Algorithms; 4.4.1 Selection; 4.4.2 Mutation; 4.4.3 Crossover; 4.5 Dynamic System Models of Genetic Algorithms; 4.5.1 Selection; 4.5.2 Mutation; 4.5.3 Crossover; 4.6 Conclusion; Problems; 5 Evolutionary Programming; 5.1 Continuous Evolutionary Programming; 5.2 Finite State Machine Optimization
5.3 Discrete Evolutionary Programming5.4 The Prisoner's Dilemma; 5.5 The Artificial Ant Problem; 5.6 Conclusion; Problems; 6 Evolution Strategies; 6.1 The (1+1) Evolution Strategy; 6.2 The 1/5 Rule: A Derivation; 6.3 The (+l) Evolution Strategy; 6.4 (+) and (,) Evolution Strategies; 6.5 Self-Adaptive Evolution Strategies; 6.6 Conclusion; Problems; 7 Genetic Programming; 7.1 Lisp: The Language of Genetic Programming; 7.2 The Fundamentals of Genetic Programming; 7.2.1 Fitness Measure; 7.2.2 Termination Criteria; 7.2.3 Terminal Set; 7.2.4 Function Set; 7.2.5 Initialization
7.2.6 Genetic Programming Parameters7.3 Genetic Programming for Minimum Time Control; 7.4 Genetic Programming Bloat; 7.5 Evolving Entities other than Computer Programs; 7.6 Mathematical Analysis of Genetic Programming; 7.6.1 Definitions and Notation; 7.6.2 Selection and Crossover; 7.6.3 Mutation and Final Results; 7.7 Conclusion; Problems; 8 Evolutionary Algorithm Variations; 8.1 Initialization; 8.2 Convergence Criteria; 8.3 Problem Representation Using Gray Coding; 8.4 Elitism; 8.5 Steady-State and Generational Algorithms; 8.6 Population Diversity; 8.6.1 Duplicate Individuals
8.6.2 Niche-Based and Species-Based Recombination

Sommario/riassunto

A clear and lucid bottom-up approach to the basic principles of evolutionary algorithms Evolutionary algorithms (EAs) are a type of artificial intelligence. EAs are motivated by optimization processes that we observe in nature, such as natural selection, species migration, bird swarms, human culture, and ant colonies. This book discusses the theory, history, mathematics, and programming of evolutionary optimization algorithms. Featured algorithms include genetic algorithms, genetic programming, ant colony optimization, particle swarm optimization, differential evolution, biog