1. Record Nr. UNINA9910734097603321

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| Titolo | Theory of Evolutionary Computation : Recent Developments in Discrete Optimization / / edited by Benjamin Doerr, Frank Neumann |
| Pubbl/distr/stampa | Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020 |
| ISBN | 3-030-29414-5 |
| Edizione | [1st ed. 2020.] |
| Descrizione fisica | 1 online resource (XII, 506 p. 27 illus., 17 illus. in color.) |
| Collana | Natural Computing Series, , 2627-6461 |
| Disciplina | 004.0151 |
| Soggetti | Computer science<br>Artificial intelligence<br>Mathematical optimization<br>Operations research<br>Theory of Computation<br>Artificial Intelligence<br>Optimization<br>Operations Research and Decision Theory |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di contenuto | Probabilistic Tools for the Analysis of Randomized Optimization Heuristics -- Drift Analysis -- Complexity Theory for Discrete Black-Box Optimization Heuristics -- Parameterized Complexity Analysis of Randomized Search Heuristics -- Analysing Stochastic Search Heuristics Operating on a Fixed Budget -- Theory of Parameter Control for Discrete Black-Box Optimization: Provable Performance Gains Through Dynamic Parameter Choices -- Analysis of Evolutionary Algorithms in Dynamic and Stochastic Environments -- The Benefits of Population Diversity in Evolutionary Algorithms: A Survey of Rigorous Runtime Analyses -- Theory of Estimation-of-Distribution Algorithms -- Theoretical Foundations of Immune-Inspired Randomized Search Heuristics for Optimization -- Computational Complexity Analysis of Genetic Programming. |
| Sommario/riassunto | This edited book reports on recent developments in the theory of evolutionary computation, or more generally the domain of randomized |

search heuristics. It starts with two chapters on mathematical methods that are often used in the analysis of randomized search heuristics, followed by three chapters on how to measure the complexity of a search heuristic: black-box complexity, a counterpart of classical complexity theory in black-box optimization; parameterized complexity, aimed at a more fine-grained view of the difficulty of problems; and the fixed-budget perspective, which answers the question of how good a solution will be after investing a certain computational budget. The book then describes theoretical results on three important questions in evolutionary computation: how to profit from changing the parameters during the run of an algorithm; how evolutionary algorithms cope with dynamically changing or stochastic environments; and how population diversity influences performance. Finally, the book looks at three algorithm classes that have only recently become the focus of theoretical work: estimation-of-distribution algorithms; artificial immune systems; and genetic programming. Throughout the book the contributing authors try to develop an understanding for how these methods work, and why they are so successful in many applications. The book will be useful for students and researchers in theoretical computer science and evolutionary computing.