Lecture Notes in Computer Science 10782

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

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Evolutionary Computation in Combinatorial Optimization

18th European Conference, EvoCOP 2018
Parma, Italy, April 4–6, 2018
Proceedings

Springer

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Preface

Evolutionary computation techniques and metaheuristics have emerged as methods of choice when tackling challenging problems from combinatorial optimization that appear in various industrial, economic, and scientific domains. In such problems, the goal is to identify high-quality solutions in a large space of discrete variables. Owing to their high complexity and large combinatorics, large and difficult combinatorial optimization problems can typically not be solved to optimality in a reasonable amount of time. This is the reason why decision-makers and analysts have to rely on heuristic algorithms. Among them, metaheuristics comprise a whole family of optimization approaches that include evolutionary algorithms and other nature-inspired approaches such as ant colony and particle swarm optimization, as well as advanced local search methods such as simulated annealing and tabu search. These search paradigms rely on stochastic operators, and constitute general-purpose methodologies that guide the design of heuristic algorithms for solving a given optimization problem. At the crossroads of computer science, discrete mathematics, operations research and decision support, computational intelligence, and machine learning, the successful use of evolutionary computation for combinatorial optimization is the main subject of these proceedings.

This volume contains the proceedings of EvoCOP 2018, the 18th European Conference on Evolutionary Computation in Combinatorial Optimization. The conference was held in Parma, Italy, during April 4–6, 2018. The EvoCOP conference series started in 2001, with the first workshop specifically devoted to evolutionary computation in combinatorial optimization. It became an annual conference in 2004. EvoCOP 2018 was organized together with EuroGP (the 21st European Conference on Genetic Programming), EvoMUSART (the 7th International Conference on Computational Intelligence in Music, Sound, Art and Design), and EvoApplications (the 21st European Conference on the Applications of Evolutionary Computation, formerly known as EvoWorkshops), in a joint event collectively known as EvoStar 2018. Previous EvoCOP proceedings were published by Springer in the *Lecture Notes in Computer Science* series (LNCS volumes 2037, 2279, 2611, 3004, 3448, 3906, 4446, 4972, 5482, 6022, 6622, 7245, 7832, 8600, 9026, 9595, and 10197). The table on the next page reports the statistics for each of the previous conference.

This year, 12 out of 37 papers were accepted after a rigorous double-blind process, resulting in a 32% acceptance rate. We would like to acknowledge the quality and timeliness of our Program Committee members' work. Decisions considered both the reviewers' report and the evaluation of the program chairs. The 12 accepted papers cover a wide spectrum of topics, ranging from the foundations of evolutionary computation algorithms and other search heuristics, to their accurate design and application to both single- and multi-objective combinatorial optimization problems. Fundamental and methodological aspects deal with runtime analysis, the structural properties of fitness landscapes, the study of metaheuristics core components, the clever design

EvoCOP	LNCS vol.	Submitted	Accepted	Acceptance (%)
2018	10782	37	12	32.4
2017	10197	39	16	41.0
2016	9595	44	17	38.6
2015	9026	46	19	41.3
2014	8600	42	20	47.6
2013	7832	50	23	46.0
2012	7245	48	22	45.8
2011	6622	42	22	52.4
2010	6022	69	24	34.8
2009	5482	53	21	39.6
2008	4972	69	24	34.8
2007	4446	81	21	25.9
2006	3906	77	24	31.2
2005	3448	66	24	36.4
2004	3004	86	23	26.7
2003	2611	39	19	48.7
2002	2279	32	18	56.3
2001	2037	31	23	74.2

of their search principles, and their careful selection and configuration by means of automatic algorithm configuration and hyper-heuristics. Applications cover conventional academic domains such as NK landscapes, binary quadratic programming, traveling salesman, vehicle routing, or scheduling problems, and also include real-world domains in clustering, commercial districting, and winner determination. It is our hope that the wide range of topics covered in this volume of EvoCOP proceedings reflects the current state of research in the fields of evolutionary computation and combinatorial optimization.

We would like to express our appreciation to the various persons and institutions involved in making EvoCOP 2018 a successful event. Firstly, we thank the local organization team, led by Stefano Cagnoni and Monica Mordonini, from the University of Parma, Italy. We extend our gratitude to Marc Schoenauer from Inria Saclay, France, for his continued assistance in providing the MyReview conference management system, and to Pablo García-Sánchez from the University of Cádiz, Spain, for the EvoStar publicity and website. Thanks are also due to our EvoStar coordinators Anna I Esparcia-Alcázar, from Universitat Politècnica de València, Spain, and Jennifer Willies, as well as to the SPECIES (Society for the Promotion of Evolutionary Computation in Europe and its Surroundings) executive board, including Marc Schoenauer (President), Anna I Esparcia-Alcázar (Secretary and Vice-President), and Wolfgang Banzhaf (Treasurer). We finally wish to thank our prominent keynote speakers, Una-May O'Reilly (MIT Computer Science and Artificial Intelligence Laboratory, USA) and Penousal Machado (Computational Design and Visualization Lab at the University of Coimbra, Portugal).

Special thanks also to Christian Blum, Francisco Chicano, Carlos Cotta, Peter Cowling, Jens Gottlieb, Jin-Kao Hao, Bin Hu, Jano van Hemert, Peter Merz, Martin Middendorf, Gabriela Ochoa, and Günther R. Raidl for their hard work and dedication during past editions of EvoCOP, making this one of the reference international events in evolutionary computation and metaheuristics.

April 2018   Arnaud Liefooghe
                                                              Manuel López-Ibáñez

Organization

EvoCOP 2018 was organized jointly with EuroGP 2018, EvoMUSART 2018, and EvoApplications 2018.

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