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Title: Parameterized Analysis of Bio-inspired Computing

Abstract:
The parameterized analysis of bio-inspired computing provides a new way of gaining additional insights into the working behavior of popular approaches such as evolutionary algorithms and ant colony optimization. I will give an overview on two important approaches in this area. The area of parameterized runtime analysis studies the runtime of bio-inspired computing with respect to different parameters of the given problem instance and builds on the success of rigorous runtime analysis of bio-inspired computing in the last 20 years. The feature-based analysis of algorithms for a given optimization problem uses statistical methods to figure out which features of a given problem instance leads to a good or bad performance of the algorithm under consideration. It often uses an evolutionary algorithm for evolving problem instances that exhibit performance differences between a given set of solver and can be used for effective algorithm selection.

Bio-sketch:
Frank Neumann received his diploma and Ph.D. from the Christian-Albrechts-University of Kiel in 2002 and 2006, respectively. He is a professor and leader of the Optimisation and Logistics Group at the School of Computer Science, The University of Adelaide, Australia. Frank has been the general chair of the ACM GECCO 2016. With Kenneth De Jong he organised ACM FOGA 2013 in Adelaide and together with Carsten Witt he has written the textbook "Bioinspired Computation in Combinatorial Optimization - Algorithms and Their Computational Complexity" published by Springer. He is an Associate Editor of the journals "Evolutionary Computation" (MIT Press) and "IEEE Transactions on Evolutionary Computation" (IEEE). In his work, he considers algorithmic approaches in particular for combinatorial and multi-objective optimization problems and focuses on theoretical aspects of evolutionary computation as well as high impact applications in the areas of renewable energy, logistics, and mining.