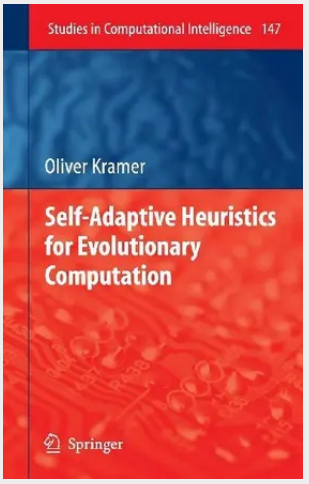
Kramer

Self-Adaptive Heuristics for Evolutionary Computation

Evolutionary algorithms are successful biologically inspired meta-heuristics. Their success depends on adequate parameter settings. The question arises: how can evolutionary algorithms learn parameters automatically during the optimization? Evolution strategies gave an answer decades ago: self-adaptation. Their self-adaptive mutation control turned out to be exceptionally successful. But nevertheless self-adaptation has not achieved the attention it deserves.

This book introduces various types of self-adaptive parameters for evolutionary computation. Biased mutation for evolution strategies is useful for constrained search spaces. Self-adaptive inversion mutation accelerates the search on combinatorial TSP-like problems. After the analysis of self-adaptive crossover operators the book concentrates on premature convergence of self-adaptive mutation control at the constraint boundary. Besides extensive experiments, statistical tests and some theoretical investigations enrich the analysis of the proposed concepts.

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