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Evolutionary Algorithms for Discrete Optimization Tasks

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Abstract:

The aim of the dissertation thesis will be research of benchmarking and applicability of evolutionary algorithms (including other heuristic / metaheuristic approaches) for solving NP problems, mainly from the category of NP-complete (NPC) problems. The aim will also be to carry out a detailed analysis of the current state of algorithms for solving optimization problems with discrete parameters; use the gained knowledge for design and implementation of effective discrete versions, for constrained and possibly for multi-criteria problems. The focus will be mainly (but not limited) on the differential evolution algorithm, especially on modern implementations of the L-SHADE / DISH algorithm. Benchmarking will be performed on the new DBBOB platform and also on real problems in the areas of cryptography, planning, game theory and many others. The thesis will also examine the applicability of various self-adaptation mechanisms and restructuring the population dynamics of algorithms developed in A.I.Lab at FAI.

Literature:

[1] Das, Swagatam, Sankha Subhra Mullick a P.N. Suganthan. Recent advances in differential evolution ? An updated survey. Swarm and Evolutionary Computation, 2016, 27, 1-30, DOI: 10.1016/j.swevo.2016.01.004. ISSN 22106502.

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