Comparison of Evolutionary Algorithms for Design Optimization

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Abstract. The production of specimen for microsystems or microcomponents is both, time and material-consuming. In a traditional design process the number of possible variations which can be considered is very limited. Thus, in micro-system technology computer-based design techniques become more and more important - similar to the development of microelectronics.
In this paper we compare Evolutionary Algorithms based on Evolution Strategies and the extended Genetic Algorithm GLEAM for solving the design optimization problem. The reference problem is the design optimization of a 2-lens-system being part of a heterodyne receiver, a microoptical communication module. As this is a real world problem, the design must be as insensitive to fabrication tolerances as possible. The results obtained are compared to a more complex task: the robot path planning problem.