

The goal of this thesis was to explore the possibilities of using evolutionary algorithms to design components with specific purpose. We examined the process of designing an optimal shape of reflector from a highly reflective metal sheet. The main goal of this reflector is to evenly distribute light from a light emitting diode.

We created a simplified model of the environment, where our component should be used. Then we used the evolutionary approach to find a suitable reflector shape for an existing device. One selected solution was manufactured and its properties measured. We also used the developed program to search for a design of an optical part for a completely new device proposal.

Both tasks were accompanied by a number of problems that originated in an inaccurate task specification and general disparity between the fields of evolutionary computation and industrial components development. We provided an analysis of issues we encountered and presented solutions that can be applied to other similar tasks.