

ABSTRACT

BENTES, Matheus Correia. Implementation of an extrinsic evolutionary platform for electronic circuits. 2020. 140f. Dissertation (Master in Electronic Engineering) - Faculty of Engineering, State University of Rio de Janeiro, Rio de Janeiro, 2020.

This work presents an electronic circuit evolution platform based on genetic algorithms with different modes of operation. The platform has an extrinsic structure for evaluating individuals, making calls to a circuit simulator for each possible evaluated solution. The platform can perform evolutions in search of values for components, additional topologies to a fixed circuit and a search with total variation in the types of components, values and connections. The suitability assessment can be based on a single objective, evaluating only the output of the circuit, but also on several objectives. The method chosen for this quantification of multiple objectives is based on a Fuzzy System in order to facilitate the designer's specification. The evolutions can be carried out in the time domain as well as in the frequency domain, being possible for the user to change the operating mode without changes in the code already created. The switching between operating modes, inputs used and the use of functions present on the platform is carried out directly through configuration variables, without the need to change the platform source code. In order to verify the performance of the platform, each mode was evaluated using different circuits with varying complexities. In the course of the work a conclusion is presented of the impact of each variable and the way used in the evolution process.

Keywords: Evolutionary Electronics; Electronic circuits; Genetic Algorithms; Fuzzy systems; Multiobjective optimization.