Thesis supervisor's report

Master's thesis title: **RELAY FEEDBACK IDENTIFICATION USING GUIDING EVOLUTIONARY ALGORITHM**

Author's name: Adrian SALDANHA

The first part of Saldanha's diploma thesis is devoted to verifying the functionality of the recently published GEA optimization algorithm and comparing it with the PSO (Particle Swarm Optimization) and BAT algorithms, which also use swarm intelligence. The successfully tested GEA algorithm is further used for system identification based on the knowledge of the system input and output obtained during the relay feedback control. The SOTD (Second Order Time Delayed) model is used for this purpose. Subsequently, the author selected and used three methods for tuning the PID controller to control the selected systems. A large part of the work then consisted of verifying the results obtained on simulation models and real laboratory processes.

When solving the assigned task, Mr. Saldanha had to get acquainted in detail with various optimization methods using swarm intelligence. He programmed three algorithms GEA, PSO, BAT in Matlab / Simulink environment and verified their properties on selected functions. Here, I especially appreciate the modification of the GEA algorithm, which improved the efficiency of the algorithm. Analysis of the advantages and disadvantages of the selected methods is actually very important. The graduate demonstrated the practical use of the achieved results in relay feedback identification and subsequent control using a PID controller on simulation systems and on real laboratory processes.

The author worked independently and very intensively throughout the solution of the assigned task according to the instructions. As part of his diploma thesis, he managed to complete tasks even to a greater extent than required. The text is logically organized and the literature sources are listed and quoted. The presented work has an excellent content level and is fully focused on the solved task.

The diploma thesis meets the requirements of the assignment, and therefore I recommend accepting it for defense and evaluating it with the classification grade

e x c e l l e n t (A)

Date 24. 8. 2020   prof. Ing. Milan Hofreiter,CSc.