Review of diploma thesis

Title: Locomotion Generation for Modular Robots

Student: Milan Prouza

The presented thesis is concerned with the generation of locomotion patterns for sets of interconnected and collaborative modular robots. It is written in English and divides into five chapters. An introduction to the studied research field is given in the first chapter, followed by a state of the art in chapter two. In chapter three the author describes the investigated approach, consisting of central pattern generators that are optimized by a meta-heuristic. Two different meta-heuristics have been investigated and compared, namely genetic algorithm and particle swarm optimization. The experimental setting and results obtained by simulations are shown in chapter four. Finally a conclusion of the gathered results if given in the fifth chapter.

The overall impression of the submitted thesis is, that the student made a decent and comprehensive work. With few exceptions, the English text is written reasonably and the used pictures foster comprehension (e.g. graphs and descriptions in the subsection 4.3.3 could be explained in a more intelligible manner). The text mentions that the utilized simulator was written for the thesis, however it doesn't clarify if the simulator was implemented by the student nor does it closer describe the simulator. Also the extensive experiments described in the thesis, yield more results than mentioned in the conclusion. These details give the impression that the submitted thesis doesn't reflect the whole work done.

Questions:

- The CPG parameter chosen for optimization can, under some circumstances, produce unsteady, divergent motions. Was that an intended behavior and is the student aware of limit cycles?
- In chapter 4.3.3 a new CPG model is introduced as feedback nonlinear CPG. Why does the student believe that this model yields more feedback than the before mentioned nonlinear CPG model?
- Chapter 4.3.4 mentions experiments with real robots, however no results where shown. Why?

For the stated reasons I recommend grade B

In Karlsruhe, 20 May 2015

Sergej Neumann M.Sc.