

I. IDENTIFICATION DATA

Thesis title:	Reinforcement Learning for Quadrupedal Robot Control with Novel Kinematics
Author's name:	Bc. Andrej Kružliak
Type of thesis :	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Cybernetics
Thesis reviewer:	MSc. Rastislav Marko
Reviewer's department:	Panza Robotics, s.r.o.

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
The project was challenging from several points of view. The project involved work with a large codebase in a relatively new framework offering limited support, which came with its challenges when implementing the novel type of kinematics. On the theoretical level, reinforcement learning is notoriously hard to apply successfully.	

Fulfilment of assignment	fulfilled
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
The assigned tasks have been fulfilled with a balanced coverage. The work provides a good overview of the quadruped kinematic solutions, reinforcement learning methods for body controllers and the state of the art frameworks used in this domain. The experimentation and results part sufficiently covers the goals of the thesis and concludes the results.	

Activity and independence when creating final thesis	A-excellent
<i>Assess whether the student had a positive approach, whether the time limits were met, whether the conception was regularly consulted and whether the student was well prepared; for the consultations. Assess the student's ability to work independently.</i>	
The student approached the project very proactively. In the beginning, he laid out a time plan, which he did a great job adhering to. During his thesis he was active also in public opensource projects, independently identifying bugs and engaging with the developer community. The student did not require much guidance from the supervisor and any feedback he received was incorporated effortlessly. He demonstrated great effectiveness collaborating with other colleagues at Panza Robotics, solving problems on the border of the scope of his thesis.	

Technical level	A-excellent
<i>Is the thesis technically sound? How well did the student employ expertise in his/her field of study? Does the student explain clearly what he/she has done?</i>	
The student showed strong command of both practical and theoretical skills in his domain. His work manifested in quality code contribution, implementing suitable approaches and methods for the given tasks. Despite the reward design in reinforcement learning being partially an empirical discipline, the student managed to maintain scientific rigor utilizing independent metrics for evaluation. The communication of the conducted work as well as the results and benchmarking are rigorous and on a high technical level.	

Formal level and language level, scope of thesis	A-excellent
<i>Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?</i>	
The student placed great emphasis on the thesis report, organizing the theoretical and experimental content logically and clearly, presenting the work with good English and informative visuals, left with only minor imperfections.	

Selection of sources, citation correctness**B-very good**

Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?

Despite very little initial inputs, the thesis extensively cites relevant works from the domain, satisfying the standards, with minor errors. The student's contributions are clearly distinguished from the cited parts.

Additional commentary and evaluation (optional)

Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

The student has delivered a quality thesis on a very unique topic. His practical contribution serves as a solid basis for further work on the topic or reinforcement learning with the robot platform with novel kinematics, which is of high value for the Panza Robotics company.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

Summarize your opinion on the thesis and explain your final grading.

Despite the complexity of the topic, the student proceeded very fast and independently in accomplishing the unique goals of the thesis. He delivered excellent results both in the form of the assembled knowledge base, conducted experiments, final report and the software infrastructure that can be built on top of.

The grade that I award for the thesis is **A-excellent**.

Date: 22.1.2024

Signature: