Slovak University of Technology in Bratislava
Department of Information Engineering and Process Control

Faculty of Chemical and Food Technology
Academic year: 2019/2020
Reg. No.: FCHPT-5414-77593

STU FCHPT

MASTER THESIS TOPIC

Student: **Bc. Alexey Morozov**
Student's ID: 77593
Study programme: Automation and Information Engineering in Chemistry and Food Industry
Study field: Cybernetics
Thesis supervisor: Ing. Martin Klaučo, PhD.
Consultant: Ing. Matúš Furka
Workplace: Oddelenie informatizácie a riadenia procesov

Topic: **Nonlinear Predictive Control of Rotary Inverted Pendulum**

Language of thesis: English

Specification of Assignment:

This thesis deals with the design and implementation of a non-linear predictive controller on a rotary inverted pendulum. The main task of this thesis is to design an optimal swing-up controller using calculus of variations method.

Particular tasks include
1. Mathematical modeling of the rotary pendulum device.
2. Construction of optimal control algorithms.
3. Implementation of the optimal swing-up controller on a laboratory device.

Length of thesis: 60

Selected bibliography:

1. Mikleš, J. – Fikar, M. *Process modelling, identification and control 2. Identification and Optimal Control.* 2004. 260 p. ISBN 80-227-2132-8.
2. Joel A E Andersson and Joris Gillis and Greg Horn and James B Rawlings and Moritz Diehl, CasADi – Asoftware framework for nonlinear optimization and optimal control, Mathematical Programming Computation, Springer, 2019

Assignment procedure from: 26. 02. 2020

Date of thesis submission: 17. 05. 2020

Bc. Alexey Morozov
Student

prof. Ing. Miroslav Fikar, DrSc.
Head of department

prof. Ing. Miroslav Fikar, DrSc.
Study programme supervisor