

Advanced Robot Control

Introduction

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Presentation compiled for taking notes during lecture



Wrocław University
of Science and Technology



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Credit rules (1/2)

Lecture ends with a final test.

The final grade for the course is calculated using below formula

$$G = \frac{1}{2}T + \frac{1}{2}L \quad (1)$$

where T is a grade from lecture test and L is a grade from laboratory classes.

Both grades (T and L) have to be positive to get a positive course grade.



Credit rules (2/2)

Short tests cover material from present or previous lectures.

$$T = \frac{1}{n-1} \sum_{i=1}^{n-1} T_{s,i} \quad (2)$$

where

- $T_{s,i}$ – i^{th} short test grade,
- n – total number of short tests.

The worst grade from short test is rejected, it includes the situation when the student is not present at the lecture when a short test is written.

If above condition is not met then $T = T_f$ (grade from final test).



Website

Additional information about this course is available at
`edu.domski.pl`.

You have to go to *Kursy*->*Advanced Robot Control* tab and
select *lecture* or *laboratory classes*



Office hours

Office hours will be available at `edu.domski.pl`.
You have to go to *Konsultacje* tab.
The office hours are held in room 209A, building C3.



Course outline

The course covers following subjects:

- input–output decoupling method for a manipulator,
- introduction to microcontrollers architecture,
- review of microcontroller peripherals,
- introduction to real-time operating systems,
- embedded system design,
- system decomposition,
- implementation of robot controller on a microcontroller.



Literature

- Siciliano, B. and Khatib, O., *Handbook of Robotics*, 2007, Springer,
- Ben-Ari, M. and Mondada, F., *Elements of Robotics*, 2018, Springer,
- Åström, K. J. and Hägglund, T., *PID Controllers: Theory, Design, and Tuning*, 1995, Instrument Society of America,
- Real Time Engineers Ltd., *The FreeRTOS™ Reference Manual*, 2016,
- Bräunl, T., *Embedded Robotics*, 2008, Springer,
- Wescott, T., *Applied Control Theory for Embedded Systems*, 2006, Elsevier,
- lecture notes,
- [manufacture manuals](#).

