Robotic Control Theory and Systems (COMP0128)

Description

Aims:
The students will gain insight into robotics and autonomous systems control theory and practice, specifically:
- LTI systems and ways of expressing system dynamics
- Control loops, damping, feedback and stability
- Insight into developing a working prototype of a control system for a robot that solves a specific task
- A working understanding of some of the challenges facing control systems designers in real world environments

Learning outcomes:
On successful completion of the module, a student will be able to:
1. understand the principles driving the design of control systems for robots;
2. be able to reason about control systems mathematically
3. understand control sensitivity and feedback problems;
4. understand optimization of controllers;
5. program robots and system simulations in an appropriate programming language

Content:
- The aim of this module is to provide the basic theory required for solving control problems in robotics and autonomous systems from a practitioner's point of view;
- The module presents theory and methodology for analysis and modelling of systems and signals, and methods for design and synthesis of feedback controllers. Special emphasis is placed on:
  - Control of SISO systems;
  - Fundamental control performance and stability in feedback systems;
  - Predictive control with constraints;
- In all cases, a theoretical treatment in lectures will be accompanied by corresponding practical exercises in mathematics, computer simulation or reality, in which students can exercise their skills;

Requisites:

Key information

Year: 2019/20
Credit value: 15 (150 study hours)
Delivery: PGT L7, Campus-based
Reading List: View on UCL website
Tutor: Prof Stephen Hailes
Term: Term 1
Timetable: View on UCL website

Assessment

Written examination (main exam period): 50%
Coursework: 20%
Coursework: 10%
Coursework: 5%
Coursework: 5%
Coursework: 5%
Coursework: 5%

Find out more

For more information about the department, programmes, relevant open days and to browse other modules, visit ucl.ac.uk

Disclaimer: All information correct as of August 2019. Please note that aspects of the module may be subject to change. UCL will make best efforts to inform applicants of major changes.
In order to be eligible to select this module, a student must (i) be registered on a programme for which it is a formally-approved option or elective choice AND must (i) understand basic calculus and linear algebra; and (ii) be able to program in C. These will not be taught explicitly.