

COURSE DETAIL

NON-LINEAR CONTROL AND SERVO SYSTEMS

Country

Sweden

Host Institution

Lund University

Program(s)

Lund University

UCEAP Course Level

Upper Division

UCEAP Subject Area(s)

Mechanical Engineering Mathematics Engineering

UCEAP Course Number

189

UCEAP Course Suffix**UCEAP Official Title**

NON-LINEAR CONTROL AND SERVO SYSTEMS

UCEAP Transcript Title

NON-LINEAR CONTROL

UCEAP Quarter Units

6.00

UCEAP Semester Units

4.00

Course Description

The course describes how non-linear systems can be treated through analysis, simulation, and controller design. Lectures cover non-linear phenomena; mathematical modeling of nonlinear systems; stationary points; linearization around stationary points and trajectories; phase plane analysis; stability analysis using the Lyapunov method; circle criterion; small-gain and passivity; computer tools for simulation and analysis; effects of saturation; backlash and dead-zones in control loops; describing functions for analysis of limit cycles; high-gain methods and relay feedback; optimal control; and nonlinear synthesis and design. Laboratory exercises include analysis using the describing function and control design with dead-zone compensation for an air throttle used in car motors; energy-based design of a swing-up algorithm for an inverted pendulum; and trajectory generation using optimal control for the pendulum-on-a-cart process.

Language(s) of Instruction

English

Host Institution Course Number

FRTN05

Host Institution Course Title

NON-LINEAR CONTROL AND SERVO SYSTEMS

Host Institution Course Details

<https://www.control.lth.se/education/engineering-program/frtn05-nonlinear-contr...>

Host Institution Campus

Host Institution Faculty

Engineering

Host Institution Degree

Host Institution Department

Course Last Reviewed

2022-2023

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