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 Campus

Host Institution Faculty
Engineering

Host Institution Degree

Host Institution Department

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