

Model Predictive Control – Basic MPC

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February 19-23, 2007 and March 19-21, 2007

IMM & Department of Chemical Engineering, DTU

Course description

This course gives an introduction to model predictive control (MPC) technology with an emphasis on industrial applications. Model predictive control is by far the most industrially successful advanced process control (APC) technology. MPC can be applied for multivariate processes with constraints, strong interactions, time delays and otherwise difficult dynamics. Operational benefits of MPC include increased production capacity, decreased material and energy consumption, and reduced product variability. Typical payback times for MPC projects are less than 1 year.

This course is tailored for industrial participants. The purpose is to enable participants to structure, design and tune model predictive controllers for industrial processes. This involves identification and selection of processes that can be better controlled by MPC than by classical PID technology, selection of control structure (MVs, CVs, DVs), identification of a predictive model from process data as well as design and tuning of a model based estimator, predictor, and constrained regulator. These elements will be used to construct and implement a model predictive control system that will be tested by simulation. The presentation of the topics will be with an emphasis on practical and industrially relevant issues.

Course requirements

The participants must have a working knowledge of Matlab and be familiar with basic principles of process control.

Course Schedule & Content

February 19-23: Lectures & Exercises

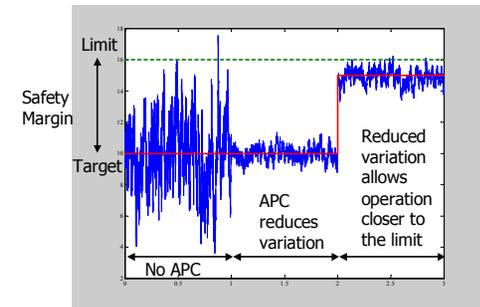
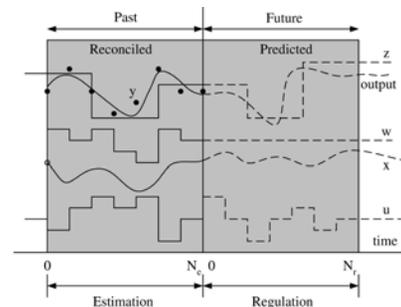
- Day 1: Introduction to simulation technology and implementation of a simple MPC
- Day 2: Optimization principles and unconstrained MPC
- Day 3: Constrained MPC and models for linear MPC
- Day 4: State estimation and system identification
- Day 5: Tuning and implementation examples.

February 24 – March 18

The participants have the opportunity to do an MPC project on a process that they select themselves. The instructors will provide feedback to this voluntary MPC project.

March 19-21: Lectures & Exercises

- Day 6: Presentation of case studies and automatic tuning procedures
- Day 7: Closed loop identification for MPC
- Day 8: Input design for identification of models for MPC & case study



Course Location:

Technical University of Denmark, DK-2800 Kgs Lyngby

Price:

Industrial participants: 15.000 DKR.
Academic participants: University agreement. 5 ECTS points

Please register with John Bagterp Jørgensen, jbj@imm.dtu.dk, no later than February 8th, 2007.