

Model Predictive Control

Prof. Daniel Honc, *University of Pardubice*

Speaker

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Date

19th of October 2022 – 10 AM to 3 PM

20th of October 2022 - 10 AM to 3 PM

Registration

Send your request of participation to phd.energy@unipa.it by 18th of October 2023

Hosted by

PhD course in "Energy", cycle 39
Department of Engineering, University of Palermo

Workshop for PhD students and Research Fellows on "Model Predictive Control"

Model Predictive Control (MPC) is an iterative advanced model-based control method optimizing the manipulatable inputs and predicted process behavior on a finite horizon. The strength of those methods lies in fully exploiting plant dynamics, flexibility in achieving complex goals under respecting process constraints. On the other hand, such methods are algorithmically complex, numerically expensive and their benefits depends mostly on the quality of the process model.

At the workshop MPC will be introduced and explained – cost function formulation, predictor derivation, both analytical and numerical solution - for external description with transfer function and internal description with state-space model. Examples in MATLAB will be solved e.g. to demonstrate MPC parameters tuning to show their influence on the control responses. Also, sensitivity to measurement noise, model mismatch and disturbances will be discussed and demonstrated.

Program

- 1st Day
 - introduction, problem formulation, cost function, predictor for state-space model, analytical solution
 - predictor for transfer function model, numerical solution – quadratic programming
- 2rd Day
 - simulations in MATLAB, parameters tuning, sensitivity to noise, disturbance rejection
 - final exam



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