Model Predictive Control

Prof. Daniel Honc, *University of Pardubice*

Speaker

Prof. Daniel Honc, PhD.
Vice-Dean for Education and Performance
Department of Automation and Mathematics
Faculty of Electrical Engineering and Informatics
University of Pardubice
Czech Republic

Date

30th of September 2024

- 2:00 to 7:00 PM

1st of October 2024

- 2:00 to 7:00 PM

Registration

Send your request of participation to
phd.energy@unipa.it
by 27th of September 2024

Hosted by

PhD course in "**Energy**"
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 and for transfer function model, analytical solution

■ 2nd Day: numerical solution – quadratic programming, simulations in MATLAB, parameters tuning, sensitivity to noise, disturbance rejection, oral exam

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