FUDIPO

WHAT'S GOING ON?

ONE YEAR SINCE THE PROJECT BEGAN

FUDIPO project set off past 1st October 2016, by a group of organisations interested in **process optimisation as media to achieve energy and resource efficiency in industry processes.**

Concretely, FUDIPO is facing SPIRE-02-2016 topic: "Plant-wide monitoring and control of data-intensive processes", developing and testing an integrated set of methods combining mathematical modelling and simulation with experiments in pilot and full-scale facilities: **oil refinery, pulp and paper, heat power plants, and waste water treatment plant.**

MÄLARDALENS HÖGSKOLA ESKILSTUNA VÄSTERÅS

MälarEnergi

Fraunhofer

MTT
micro turbine technology bv

tieto

ABB

RI.SE

BESTWOOD

idener

Tüpraş

BILLERUDKORSNÄS

Physical meetings

Kick of meeting, 17-18 October 2016 ➕

Visit to ABB and Mälarenergi study cases, 10-12 May 2017 ➕

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Next project meetings

Meeting in Vienna 17-18 October 2017

FUDIPO 1st Annual Review Meeting will take place in Vienna, hosted by our partner Tieto. General project management will be reviewed and a big emphasis will be placed on the case study status. Moreover , during the second and third day several workshops will take place about framework architecture, function integration, technical requirements, and HMI3 platform

Learning systems PhD course

FUDIPO will have a PhD course on "learning systems" during the autumn 2017. An introduction to what we are aiming at relating to how the brain is working is made by Erik Dahlquist (project coordinator). After this introduction we will go through specific techniques which are important for **improving performance in process industries using learning systems,** that is algorithms bringing new information for enhancement of models and then use for advanced process control on a higher level. The subjects covered will be:

- **Decision support,** by Farzaneh Ahmadzadeh
- **Diagnostics**, by Konstantinos Kyprianidis (MDH)
- **Production planning and optimization**, by Markus Bohlin (RISE)
- **Model based control/Model predictive control**, by Alejandro del Real Torres (IDENER)
- **Soft sensors**, by Erik Dahlquist and Tomas Olsson (MDH and RISE)
- **Data Quality Assurance and Control,** by Richard Reisinger (Tieto)
- **Deep learning,** by Lars Asplund and Erik Dahlquist (MDH)
- **Learning algorithms,** by Erik Dahlquist and Tomas Olsson (MDH and RISE)
- **How to adapt models?**, by Erik Dahlquist (MDH)

Those who are interested to attend the course via skype, please contact with course coordinators:
erik.dahquist@mdh.se,
tomas.olsson@ri.se

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Attendance to events

MDH attended to Papercon (USA) , 23rd April 2017

MDH presented a conference paper (see below) about **Model Predictive Control for Pulp and Paper applications. BillerudKorsnäs**, member of FUDIPO consortium, is a leading provider of renewable packaging material in Europe, and part of its processes are study cases of the project.

IDENER will attend to 2017 EU Process Industry Conference to present FUDIPO project and strengthen the network, 19th September 2017

IDENER attended to Europact (Postdam),10th May 2017
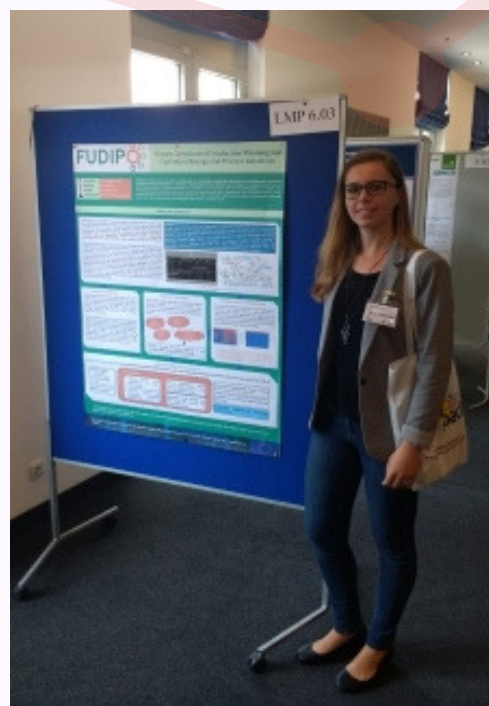
Idener attended to **Europact 2017** organised by Dechema organisation, to present 3 posters about the project and build links with related projects .
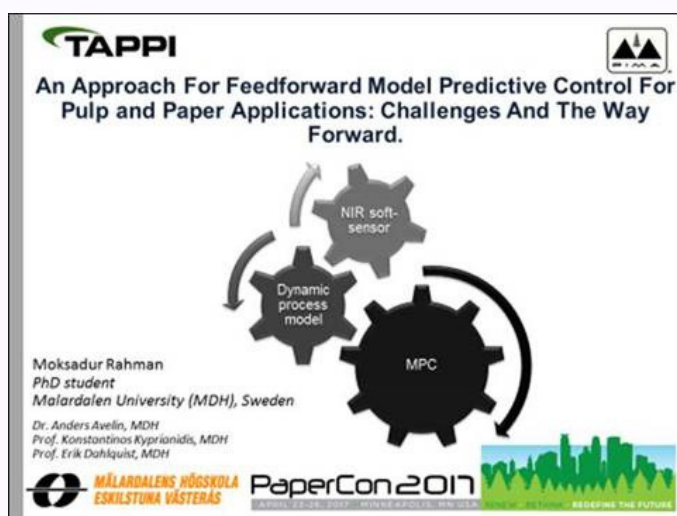
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Publications

AN APPROACH FOR FEEDFORWARD MODEL PREDICTIVE CONTROL FOR PULP AND PAPER APPLICATIONS: CHALLENGES AND THE WAY FORWARD

Moksadur Rahman, Anders Avelin, Konstantinos Kyprianidis and Erik Dahlquist. (Mälardalen University, Västeras, Sweden)

Abstract: Due to the naturally varying feedstock, significant residence time, insufficient measurements and complex nature of the delignification process, producing pulp with consistent quality i.e. stable kappa number with sufficiently high yield is a challenging task that requires multi-variable process control. A wide variety of control structures, ranging from classical concepts like cascade control, feedforward, ratio control, and parallel control to more modern concepts like model-based predictive control, is used in pulp and paper industries all over the world. In this paper, a survey of model-based predictive control will be presented along with the control challenges that lie within the chemical pulping process. The potential of this control concept for overcoming the aforementioned technical challenges will also be discussed in the second part of the paper. Particular focus will be given on the use of near-infrared spectroscopy based soft-sensors coupled with dynamic process models as an enabler for feedforward model-based predictive control. Overall, the proposed control concept is expected to significantly improve process performance, in the presence of measurement noise and various complex chemical process uncertainties common in pulp and paper applications.poco de texto

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