Integrated Control and Optimization for the Process Industry

Results of a research project funded by the European Commission

Martin Friedrich

Bayer Technology Services

INCOOP Workshop

Düsseldorf, January 23 -24, 2003

Overview

- Welcome
- Workshop goal
- Goal of research project
- Partners and their roles in the project
- Agenda
- Organisational

Goals for the Workshop

- To present results obtained during the joint research project
  „Integrated Process Control and Plantwide Optimisation“
  funded by the European Commission

- To initiate discussion about current state of the art and future needs

- To encourage future collaboration

Goals of joint project

Integrated process control and plantwide optimisation:

- improve existing control and optimisation technology for process industry
- develop methods and tools for industrial applications of
  - dynamic real time optimisation
  - nonlinear model predictive control
- test developed tools on industrial examples
- evaluate cost-benefit-ratio

Project Partners

- RWTH Aachen: **W. Marquardt**, M. Schlegel, J. Kadam
  - dynamic real time optimisation
- TU Delft: **O. Bosgra, J. Grievink**, A. Huesman, D. v. Hessem, J. v. d. Berg, P. Schmal, R. Tousain, P. Verheijen
  - hybrid modelling, model reduction, state estimation, software environment
- TU Eindhoven: **P. v. d. Bosch**, S. Weiland, A. Tiagounov, M. Balenovic
  - NMPC, software environment
- IPCOS: **T. Backx**, J. Ludlage
  - project management, software architecture / implementation
- MDC Technology: **C. Hawkins**
  - D-RTO tools
- Shell Chemicals: **P. J. Brouwer**, S. de Wolf, C. Colantonio
  - example process I
- Bayer AG: **H. de Meyer, M. Friedrich**, G. Dünnebier, K.-U. Klatt
  - project coordination, example process II

Agenda Jan. 23, 2003

11:00	Welcome and introduction	Martin Friedrich, Bayer AG
11:15	General scope, goals and overview of INCOOP	Ton Backx, IPCOS Technology
12:15	Lunch	
13:30	Invited lecture:	Costas Pantelides, PSE Ltd.
	Process modeling and model-based automation	
14:30	Real time dynamic optimization	Wolfgang Marquardt, RWTH Aachen
15:15	Coffee break	
15:30	State estimation and long horizon MPC for nonlinear industrial applications	Siep Weiland, TU Eindhoven
16:15	Hybrid modeling and model reduction	Johan Grievink, TU Delft
17:00	Coffee break	
17:15	Industrial challenges and requirements for optimization and control of the Shell case study	Piet-Jan Brouwer, Shell Chemicals
17:45	Industrial challenges and requirements for optimization and control of polymerisation processes	Guido Dünnebier, Bayer AG
19:45	Dinner	

Agenda Jan. 24, 2003

08:30	Invited lecture:	Philippe Hayot, Dow Chemicals
	Plant-wide online dynamic modelling with state estimation .	
09:30	INCOOP software architecture	Mario Balenovic, TU Eindhoven
10:00	Start of software demonstration	Mario Balenovic, TU Eindhoven
10:15	Coffee break	
10:30	INCOOP methodology applied to Shell case	Adrie Huesman, TU Delft
		Peter Verheijen, TU Delft
11:00	INCOOP methodology applied to Bayer case	Jitendra V. Kadam, RWTH Aachen
11:30	Review of software demonstration	Mario Balenovic, TU Eindhoven
12:00	Final discussion, vendors' and end users' viewpoint, audience feedback	
		Ton Backx, IPCOS Technology
		Chris Hawkins, MDC Technology
12:45	Closing of the workshop	Ton Backx, IPCOS Technology

Organisation

- bus transfer from venue to hotel: departure 18.45 h
- dinner in Schumacher‘s Restaurant: 19.45 h (just a few steps from the hotel, meet at 19.30 h in lobby)
- bus transfer from hotel to venue (tomorrow): departure 7.45 h
- in case of problems: contact information desk