

Plantwide Process Control

Selecting economic controlled variables
"self-optimizing control"

Sigurd Skogestad, NTNU
Johannes Jäschke, NTNU

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Project funds for North America 2013

Application

Project information

Project title Control Strategies for Rapidly Changing Economic Conditions

Project number PNA-2013/10121

Application for project related to: (choose one)

Establishing new collaboration



Center for Automation
Technologies and Systems

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Sigurd Skogestad

- Siv. Ing. Chem. Eng., NTNU, 1978
- Norwegian Defence Research Institute
- Norsk Hydro – process design & simulation
- Ph.D. Cal Tech, 1987
- Prof. NTNU since 1987, Head, 1999-2009
- 200 journal publications
- 200 conference publications
- Co-author (with Ian Postlethwaite, *Multivariable Feedback Control*, Wiley (2nd ed. 2005))
- AIChE Ted Peterson Award 1989
- Axelby Outstanding Paper, IEEE, 1990
- Hugo Schuck Best Paper Award (ACC) 1992
- *Comp. Chem. Engng.* best paper, 2004
- Process Control Hall of Fame, 2011
- IFAC Technical Board, 2008-2014



Johannes Jäschke

- Dipl.-Ing. Mech. Eng., Aachen, 2007
- Ph.D. NTNU, 2011
- Postdoc
- CMU, fast economic MPC

PSE, focus on modelling, numerical optimization and control.

By linking methods from optimization and control theory, his goal is to systematically develop practically applicable solutions for operating process systems in a safe, reliable, and economical way

He is interested in energy related control applications, including optimal energy storage strategies, and optimal operation of heat exchanger networks.

Other interests include playing soccer, mountain hiking and playing the guitar and the violin.



AACC award winners left to right, Stephen P. Boyd, Elling W. Jacobsen, Sigurd Skogestad, and Thomas F. Edgar. Not pictured is Rutherford Aris.



Sigurd Skogestad

Professor of Chemical Engineering, Norwegian University of Science and Technology (NTNU)

Process control - multivariable control - PID control - plantwide control - distillation

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Citation indices

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i10-index	183	117

Citations to my articles



Show: 1-20 Next >

Title / Author	Cited by	Year
Multivariable feedback control: analysis and design S Skogestad, I Postlethwaite Wiley	5113	2007
Internal model control: PID controller design DE Rivera, M Morari, S Skogestad Industrial & engineering chemistry process design and development 25 (1 ...	904	1986
Simple analytic rules for model reduction and PID controller tuning S Skogestad Journal of process control 13 (4), 291-309	718	2003
Plantwide control: The search for the self-optimizing control structure S Skogestad Journal of process control 10 (5), 487-507	407	2000
Robust control of ill-conditioned plants: High-purity distillation S Skogestad, M Morari, JC Doyle Automatic Control, IEEE Transactions on 33 (12), 1092-1105	294	1988
Control structure design for complete chemical plants S Skogestad Computers & Chemical Engineering 28 (1), 219-234	251	2004
Dynamics and control of distillation columns: A tutorial introduction S Skogestad Chemical Engineering Research and Design 75 (6), 539-562	210	1997
Operation of integrated three-product (Petlyuk) distillation columns EA Wolff, S Skogestad Industrial & Engineering Chemistry Research 34 (8), 2004-2102	201	1995





Plantwide process control

- Part 1 (Tue AM): Plantwide control
- Part 2 (Tue PM): More on self-optimizing control. Exercise
 - **Reception at Brown's Brewing, 5:30 pm**
- Part 3 (Wed AM): Consistent inventory control, TPM location, Structure of regulatory control layer
- Part 4 (Wed PM): PID tuning
- Part 5 (Thu AM): "Advanced" control and case studies

Participants

Agung Julius

Andrew Winn

Sina Afshari

Dan Kruse

Sayan Saha

Daniel Pollock

Jacopo Tani

Brian Gregg

Daniel Howsmon

Priyadarshi Mahapatra

Jeffrey Marquis

Zehao Yang

Yan Ou

Matt Fitzgerald

Roger Knox

Wayne Bequette

Matt Titus

Nihat Baysal

Hamidreza Nourzadeh