ETH zürich

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chairman: Prof. Dr. Rudi Gunawan

DEVISING CONTROL STRUCTURES FOR COMPLETE CHEMICAL PLANTS - FROM ART TO SCIENCE

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ETH Hönggerberg, 02/12/2015
HCI G 3, 17.00 h
The Seminar will be followed by an Apéro

Abstract. A chemical plant may have thousands of measurements and control loops. By devising the control structure we do not meanmean the tuning and behavior of each of these loops, but rather the control philosophy of the overall plant with emphasis on the structural decisions.This is sometimes referred to as “plantwide control”. In practice, the control system is usually divided into several layers, separated by time scale: scheduling (weeks) , site-wide optimization (day), local optimization (hour), supervisory (predictive, advanced) control (minutes) and regulatory control (seconds). Such a hiearchical (cascade) decomposition with layers operating on different time scale is used in the control of all real (complex) systems including biological systems and airplanes, so the issues in this section are not limited to process control. In the talk the most important issues are discussed, especially related to the choice of variables that provide the link the control layers, and the location of throughput manipulator (TPM). Some simple rules for plantwide control will also be presented, and demonstrated on case studies.

Speaker highlights. Sigurd Skogestad received his Ph.D. degree from the California Institute of Technology in 1987. He has been a full professor at NTNU, Trondheim, Norway, since 1987 and he was Head of the Department of Chemical Engineering from 1999 to 2009. He is the principal author, together with Prof. Ian Postlethwaite, of the book "Multivariable feedback control" published by Wiley in 1996 (first edition) and 2005 (second edition). He received the Ted Peterson Award from AIChE in 1989, the George S. Axelby Outstanding Paper Award from IEEE in 1990, the O. Hugo Schuck Best Paper Award from the American Automatic Control Council in 1992, and the Best Paper Award 2004 from Computers and Chemical Engineering. He was an Editor of Automatica during the period 1996-2002. His research interests include the use of feedback as a tool to make the system well-behaved (including self-optimizing control), limitations on performance in linear systems, control structure design and plantwide control, interactions between process design and control, and distillation column design, control and dynamics. He is a Fellow of AIChE and IFAC.