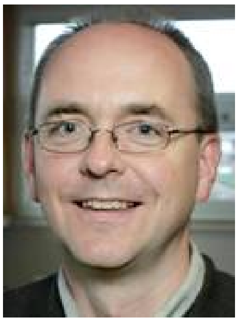

Anders Rantzer

Lund University, Sweden

July 20, 2011 (9:30am-10:20am)

Room 311, Lanbai Building, Academy of Math. & Sys. Sci., CAS

Title： Dual Decomposition for Distributed Control

Biography

Anders Rantzer was born in 1963. He received a Ph.D. degree in optimization and systems theory from the Royal Institute of Technology (KTH), Stockholm, Sweden. After postdoctoral positions at KTH and at IMA, University of Minnesota, USA, he joined the Department of Automatic Control at Lund Univeristy in Sweden 1993. He was appointed professor of Automatic Control in Lund 1999. The academic year of 2004/05 he was visiting associate faculty member at California Institute of Technology in USA.

Rantzer has been serving as associate editor of IEEE Transactions on Automatic Control and several other journals. He is a winner of the SIAM Student Paper Competition, the IFAC Congress Young Author Price and the IET Premium Award for the best article in IEE Proceedings – Control Theory & Applications during 2006. He is a Fellow of IEEE and a member of the Royal Swedish Academy of Engineering Sciences.

His research interests are in modeling, analysis and synthesis of control systems, with particular attention to uncertainty, optimization and distributed control.

Abstract

Many control applications have a decentralized structure, where each subunit has access to different information about the system state. Still, most control theory has been developed in a centralized setting, where all measurements are processed together to compute the control signals. This paradigm has conceptual advantages, but also inherent limitations in terms of complexity and integrity. The purpose of this lecture is to show how ideas from convex optimization and game theory may help to go beyond the traditional paradigm to support analysis and synthesis of distributed controllers.

In particular, we will reconsider methods for decomposition of large scale optimization problems by introduction of dual variables. These can be interpreted as prices in a market mechanism serving to achieve mutual agreement between different subproblems. The same idea can be used for decomposition of large scale control systems, with dynamics in both decision variables and prices. The dynamics bring interesting new phenomena. For example, expected future prices could be highly relevant for today's decisions.