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Lecture Room:
V 9.01

Universität Stuttgart
Campus Vaihingen
Pfaffenwaldring 9

Peter Sagirow
Distinguished Seminar Series

About the Peter Sagirow Distinguished Seminar Series

Each year, the Institute for Systems Theory and Automatic Control (IST) brings an outstanding researcher to campus to report on the state of the art, achievements and challenges in the field of systems and control. With this distinguished seminar series, the IST intends to honor the late Peter Sagirow and the decisive role he played in the development of the field of engineering cybernetics at the University of Stuttgart.

What is the Connection between Artificial Speech and Modern Mathematics, and How Can This be Used in System Identification and Robust Control?



Prof. Dr. Anders Lindquist

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Abstract

Every 30 milliseconds, your mobile telephone computes a solution to the Carathéodory extension problem — a classical mathematical problem that dates back to the beginning of last century. In 1918, Schur presented a complete parameterization of all solutions to this problem, and the one used in speech processing for a “shaping filter” is called the maximum-entropy solution. In theory, one could improve the quality of speech by choosing another solution, but a requirement on the complexity of the shaping filter renders the Schur parameterization useless and completely alters the underlying mathematical problem. We present a new approach to speech processing which provides a paradigm that can also be applied to problems in system identification, robust control, image processing, etc. It allows for smooth tuning to specifications in a class of solutions with bounded complexity. The methodology employed is a combination of nonlinear analysis, geometry and optimization, but the talk will be given on a descriptive and rather nontechnical level.

About the Speaker

Anders Lindquist is presently a Chair Professor at Shanghai Jiao Tong University in China and the Director of the Center for Industrial and Applied Mathematics at the Royal Institute of Technology (KTH), Stockholm, Sweden. Before then, he had a full academic career in the United States, after which he was appointed to the Chair of Optimization and Systems Theory at KTH. For ten years, he was also the Head of the Mathematics Department there. Lindquist is a Member of the Royal Swedish Academy of Engineering Sciences, a Foreign Member of the Chinese Academy of Sciences, a Foreign Member of the Russian Academy of Natural Sciences, an Honorary Member of the Hungarian Operations Research Society, a Life Fellow of IEEE, a Fellow of SIAM, and a Fellow of IFAC. He is an honorary doctor at the Technion, Israel, and the recipient of the 2009 Reid Prize in Mathematics from SIAM.

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