数学与系统科学研究院学术报告

报告题目：The Circulant Rational Covariance Extension Problem

报 告 人：Anders Lindquist (Shanghai Jiao Tong University, Shanghai, China, and Royal institute of technology, Stockholm, Sweden)

时间地点：10:40 - 11:40am, Nov. 4, Room 703, Siyuan Building

摘要：

The rational covariance extension problem to determine a rational spectral density given a finite number of covariance lags can be seen as a matrix completion problem to construct an infinite-dimensional positive-definite Toeplitz matrix the north-west corner of which is given. The circulant rational covariance extension problem is a modification of this problem to partial stochastic realization of periodic stationary process. The corresponding matrix completion problem then amounts to completing a finite-dimensional Toeplitz matrix that is circulant. Problems of this type occurs in image processing. Another important motivation for this problem is that it provides a natural approximation, involving only computations based on the fast Fourier transform, for the ordinary rational covariance extension problem, suggesting efficient numerical procedure for the latter. The circulant rational covariance extension problem is an inverse problem with infinitely many solutions in general, each corresponding to a bilateral ARMA representation of the underlying periodic process. This is joint work with Giotgio Picci.

报告人简介：

Anders Lindquist received his PhD degree from the Royal Institute of Technology, Stockholm, Sweden, where in 1972 he was appointed a Docent of Optimization and Systems Theory. From 1972 to 1974 he held visiting positions at the University of Florida, Brown University, and the State University of New York at Albany. In 1974 he became an Associate Professor, and in 1980 a (full) Professor of Mathematics at the University of Kentucky, where he remained until 1983. He is now a Professor at the Royal Institute of Technology, where in 1982 he was appointed to the Chair of Optimization and Systems Theory. Since then he has also held visiting positions at the University of Padova and Consiglio Nazionale delle Ricerche, Italy, Arizona State University, International Institute of Applied Systems Analysis, Vienna, Russian Academy of Sciences, Moscow, East China Normal University, Shanghai, Technion, Haifa, University of California at Berkeley, and University of Kyoto, Japan. Since 1989 he is an Affiliate Professor at Washington University, St Louis. From 2000 until December 2009 he was the Head of the Mathematics Department at the Royal Institute of Technology.

Presently, Anders Lindquist is a Zhiyuan Chair Professor and Qian Ren Scholar at the Shanghai Jiao Tong University and the Director of the Strategic Research Center for Industrial and Applied Mathematics (CIAM) at the Royal Institute of Technology. He is a Member of the Royal Swedish Academy of Engineering Sciences, a Foreign Member of the Russian Academy of Natural Sciences, a [Fellow of IEEE](http://www.ieee.org/membership_services/membership/fellows/chronology/fellows_1989.html) (Institute of Electrical and Electronics Engineers), an Honorary Member the [Hungarian Operations Research Society](http://www.mot.org.hu/old_webpage/index.en.html), a [Fellow of SIAM](http://fellows.siam.org/) (Society for Industrial and Applied Mathematics), a [Fellow of IFAC](http://www.ifac-control.org/awards/ifac-fellows) (International Federation of Automatic Control), and a Life Fellow of IEEE. He was awarded the 2009 W.T. and Idalia [Reid Prize](http://www.math.kth.se/~alq/Reid_Prize_SIAM_NEWS_okt2009.pdf) in Mathematics from SIAM and the 2003 George S. Axelby Outstanding Paper Award of the IEEE Control Systems Society (CSS). He received an [Honorary Doctorate](http://www.math.kth.se/~alq/doctorhc%28Technion%291.JPG) (Doctor Scientiarum Honoris Causa) from Technion (Israel Institute of Technology), Haifa, in June 2010.

Lindquist is presently on the editorial boards of [SIAM Review](http://www.siam.org/journals/sirev.php),  [EMS Surveys in Mathematical Sciences](http://www.ems-ph.org/journals/journal.php?jrn=emss) and [Chinese Journal of Mathematics](http://www.hindawi.com/journals/cjm/). He has served on many other editorial boards of journals, among them the Journal of Mathematical Systems, Estimation, and Control (Communicating Editor), Systems and Control Letters, Adaptive Control and Signal Processing, and Acta Automatica Sinica, as well as book series, namely Systems and Control: Foundations and Applications, Applied and Computational Control, Signals, and Circuits, and Progress in Systems and Control. Since 1983 he has been a member, and between 1985 and 1987 the chairman, of the steering committee for the biennial international symposia on the Mathematical Theory of Networks and Systems (MTNS). For the first half of 2003, he served as the scientific leader at Institut Mittag-Leffler.