数学与系统科学研究院学术报告

报告题目：Intermittent observations and hybrid dynamics: the reversal of the time direction in stochastic models and its use in optimal estimation

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时间地点：7月17日下午3:30—4:30，N224

摘要：We consider data fusion for the purpose of smoothing and interpolation based on observation records with missing data. The stochastic processes are generated by linear stochastic models, possibly hybrid. The reversal of the time direction in stochastic models allows a unified framework where the estimation is effected by the fusion of the estimates of two filters running in opposite time directions. These two filters integrate the two complementing parts of the available observation record, past and future, respectively, and their estimates are weighed in using a simple Mayne-Fraser-like formula. The paper begins by establishing a connection between time reversal in stochastic systems and all-pass extensions. A particular normalization (choice of basis) between the two time-directions allows the two to share the same sample paths and simplifies the mathematics of optimal interpolation and optimal smoothing. It is seen that the framework allows treatment of hybrid stochastic models and intermittency in observations in a rather straightforward manner. This is joint work with T.T. Georgiou.

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.