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Key Laboratory of System Control and Information Processing, Ministry of Education

学术报告会

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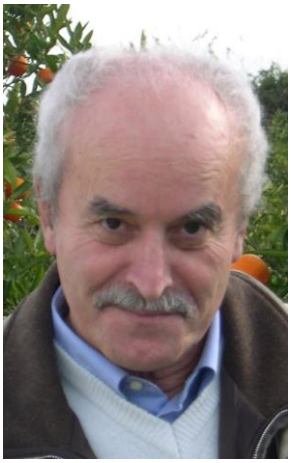
地点：电院群楼2-410会议室

An algebraic solution of the ARMA moment problem and application to state estimation in non-causal systems



Prof. Giorgio Picci

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Abstract:
Assume that the first n covariance lags of an observed scalar stationary process are given and that the corresponding Toeplitz matrix is positive definite. Consider the ARMA moment problem of finding a rational spectral density whose first n Fourier coefficients match the given covariance lags. Byrnes, Lindquist et al. have shown that, for each positive trigonometric polynomial P, there is a unique trigonometric polynomial Q of degree at most n such that P/Q is a solution, and that this solution can be determined by minimizing an entropy-like functional. We shall demonstrate that the solution of this problem involves a nonlinear equation in the unknown coefficients of the polynomial Q. This equation has a unique solution, and we propose a simple iterative scheme for computing it. In all examples tested the iteration converges to the unique solution of the problem, but a complete proof of convergence is still lacking. The procedure applies with minor modifications also to the moment problem for periodic processes. Applications to smoothing in periodic systems will be discussed. This is joint work with Bin Zhu.

Biography:
Giorgio Picci is Professor Emeritus with the Department of Information Engineering, University of Padua, Padua, Italy. He has held several long-term visiting appointments with various American, Japanese, and European universities among which Brown University, MIT, the University of Kentucky, Arizona State University, the Center for Mathematics and Computer Sciences (CWI) in Amsterdam, the Royal Institute of Technology, Stockholm, Sweden, Kyoto University, and Washington University, St. Louis, MO, USA. He has been contributing to systems and control mostly in the area of modeling, estimation, and identification of stochastic systems and published over 100 papers in this area. He is co-author with Anders Lindquist of the book {\em Linear Stochastic Systems: a geometric approach to modeling estimation and identification}, published in 2015 by Springer Verlag. Dr. Picci is a Life Fellow of IEEE, a Fellow of IFAC and a Foreign Member of the Swedish Royal Academy of Engineering Sciences. He has been chairman of the IFAC Technical Committee on Stochastic Systems, and general coordinator of the Commission of European Communities IST project RECSYS, in the fifth Framework Program.