



## Alberto Isidori

University of Rome “La Sapienza”, Italy

July 19, 2011 (8:30am-9:30am)

Room 703, Siyuan Building, Academy of Math. & Sys. Sci., CAS

**Title:** Challenges and open problems in the theory of output regulation for nonlinear systems

### Biography

**Alberto Isidori**, obtained his degree in EE from the University of Rome in 1965. Since 1975, he is Professor of Automatic Control at this University. His research interests are primarily in analysis and design of nonlinear control systems. He is the author of the highly-cited book “Nonlinear Control Systems”. He is the recipient of the “Georgio Quazza Medal” (in 1996) from the IFAC, of the “Ktesibios Award”, from the Mediterranean Control Association (in 2000) and of the “Bode Lecture Award”, from the CSS of IEEE (in 2001). In 2009, he received the “Galileo Galieei Award”, from the Italian Rotary Clubs, in recognition of his contributions to the progress of engineering sciences in Italy. In 2009 he received the Doctor of Science Honorary Degree from the KTH of Sweden. He received best paper awards from the “IEEE Transactions on Automatic Control” and “Automatica”, twice from both journals. In 1986 he was elected Fellow of IEEE and in 2005 he was elected Fellow of IFAC. He is currently President of IFAC.

### Abstract

The theory of output regulation for nonlinear SISO systems has reached a satisfactory degree of sophistication in the past few years. However, a number of relevant roadblocks still persist in the solution of the corresponding problem case for nonlinear MIMO systems. While in the case of linear systems the so-called “non resonance condition” suffices to guarantee the existence of a (robust) solution for a stabilizable and detectable plant, the problem is still open for nonlinear systems. The bottleneck is the fact that, while for linear systems robust regulation can be achieved by means of a controller whose internal model “post-processes” the regulated output, in the case of nonlinear systems it is only known how to design a “pre-processing” internal model, and this renders the resulting stabilization problem much more difficult to handle. The lecture will review problems and challenges arising in this context.