

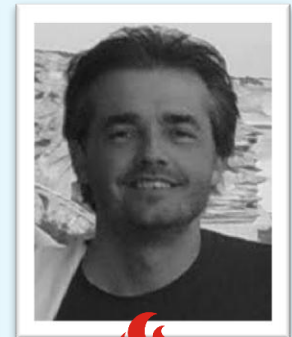
Identifiability of dynamical networks

Abstract – Much recent research has dealt with the identifiability and the identification of a dynamical network in which the node signals are connected by causal linear transfer functions and are excited by known external excitation signals and/or unknown noise signals. A major research question concerns the identifiability of the whole network - topology and all transfer functions - from the measured node signals and external excitation signals. In this seminar I'll present the fundamentals of this research topic and give an overview of early results. Most of these results have assumed that all node signals are measured and excited.

This seminar presents the first results for the situation where not all node signals are measured, which are based on graph properties, for the case where all nodes are excited. I'll show that the transfer functions that can be identified depend essentially on the topology of the paths linking the corresponding vertices to the measured nodes. A practical outcome is that, under those assumptions, a network can often be identified using only a small subset of node measurements. I'll also present some more recent identifiability results for more general excitation scenarios, and the first attempts to quantify the precision of the

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Biographical Sketch – **Alexandre Sanfelici Bazanella** received his PhD degree in Electrical Engineering in 1997. He is currently a Full Professor with the Department of Automation and Energy of Universidade Federal do Rio Grande do Sul, in Porto Alegre, Brazil. His main research interests are presently in system identification and data-driven control design, but he has also authored a number of papers in nonlinear systems theory, particularly its application to electric power systems and electrical machines. He is the author of two books: "Control Systems - Fundamentals and Design Methods" (in portuguese), and "Data-driven Controller Design: the H2 Approach" (Springer, 2011). Dr. Bazanella has served as associate editor of the IEEE Transactions on Control Systems Technology from 2002 to 2008 and as an Editor of the Journal of Control, Automation and Electrical Systems from 2008 to 2012. He has held visiting professor appointments at Universidade Federal da Paraíba in 2001 and at Université Catholique



Location: Room L2.210, Campus du Solbosch
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