



The Center for Control, Dynamical Systems, and Computation  
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Presents

## Performance Analysis of the Consensus Based Distributed Estimation Algorithms

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**Abstract:** Assume that a graph is given and that each node of this graph stores a real number. The average consensus algorithm is a procedure which allows to compute the average of this set of numbers in a distributed way, namely by exchanging information among nodes exclusively along the available links of the graph. This problem appears in a number of different application contexts such as distributed optimization, load balancing, data fusion for sensor networks, clock synchronization and coordinated control of mobile autonomous agents. The performance evaluation of this algorithm depends in fact on the specific application in which this is used. In this context we will propose some performance indices which are not typically considered in the literature. This lecture will present then consensus based algorithms, which permit to deal with the presence of randomly time-varying networks, digital communication channels and quantized or noisy data. Finally we will show how this technique can be applied for the solving distributed estimation and data fusion problems, clock synchronization and sensor calibration.

**About the Speaker:** Sandro Zampieri received the Laurea degree in Electrical Engineering and the Ph.D. Degree in System Engineering from the University of Padova, Italy, in 1988 and 1993, respectively. In 1991-92, 1993 and 1996 he was Visiting Scholar at Laboratory for Information and Decision Systems, MIT, Cambridge. He has held visiting positions also at Delf Technical University, The Netherland, at the Institut fuer Mathematik der Universitaet Innsbruck, Austria, and the Department of Mathematics at the University of Groningen, The Netherlands. Since 1992 he was Assistant Professor and since 1998 he was Associate Professor at the Department of Information Engineering, University of Padova. Since 2002 he is Full Professor in Automatic Control at the same department. Sandro Zampieri has published more than 90 journal and conference papers. He has delivered several invited seminars. He was part of International Program Committee of the IFAC Workshop on Linear Time Delay Systems 2000, of the Mathematical Theory of Networks and Systems Symposium 2002, 2004 and 2006 and of the International Symposium on Information Theory 2003. He was program co chair of IEEE international conference on Networking, Sensing and Control, 2007 and general chair of the 1st IFAC Workshop on Estimation and Control of Networked Systems 2009. He served as an Associate Editor of the Siam Journal on Control and Optimization during 2002-2004 and as the chair of the technical committee “Networked systems” for IFAC. His research interests include automatic control and dynamical systems theory, networked control and the relations between control and information theory.

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