PhysCon2013

Controlled Synchronization of Dynamical Systems

Schedule: Tu-am1**,** 9:00- 10:00hrs
Auditorium: "Rafael Nieto" Rectory Building UASLP

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Abstract:

Synchronization refers to correlated or corresponding-in-time behavior of two or more systems. Synchronization is a natural phenomenon, playing a key role to build a proper scenario to preserve a vital equilibrium, from living organisms to celestial systems.

For engineering systems performing collaborative tasks, synchronization is usually forced to make them operate properly or in an optimal way. In this case, synchronization becomes a control objective, which can be accomplished using feedback control techniques, which in turn need a good estimation of the states. Hence, closely related to the controlled synchronization problem is the observer design. Among many applications, controlled synchronization can be used in private communications, multi-robot systems, master/slave teleoperation, electrical networks, transportation systems, etc.

In this talking we present some observer designs and robust control techniques to achieve synchronization of a class of dynamical systems. We illustrate some theoretical results with experiments involving electronic circuits and mechanisms, among others.

Short CV:

Joaquin Alvarez obtained the Engineering-degree in Electronics and Telecommunications from the National Polytechnic Institute (IPN) of Mexico (1975); the M.Sc.-degree in Electrical Engineering from the Advanced Studies and Scientific Research Center (CINVESTAV) of the IPN (1976), and the Engineer-Doctor-degree in Automatic Control from the National Polytechnic Institute of Grenoble, France (1979).

From 1980 to 1987 he held a Professorial position in the Electrical Engineering Department of the CINVESTAV, and a researcher position in the Electrical Research Institute at Cuernavaca, Mexico, from 1986 to 1990. Since 1990 he has been a full professor in the Electronics and Telecommunications Department of the Scientific Research and Advanced Studies Center of Ensenada, Mexico (CICESE). He has been the Head of this Department in 1991-92 and from 2006 to 2009. He has been also part-time Professor in the Superior School of Electrical and Mechanical Engineering of the IPN and the National Center of Research and Technology (CENIDET).

He has published more than 160 papers in journals and scientific conferences, and been the leader of more than 15 scientific and technological projects. He has been also the advisor of 9 doctorate, 36 M.Sc, and 7 engineer students. He is associate editor of some scientific journals, and has been a member of the National System of Scientific Research of Mexico since 1984, where he holds the maximal level (III). Also, he is a member of the Mexican Academy of Sciences, the Mexican Academy of Engineering, the IEEE, and the Mexican Association of Automatic Control, having been the President of this Association from 1984 to 1986.
His research interests are in the fields of nonlinear control, discontinuous systems, chaos control and synchronization.