

学术报告会

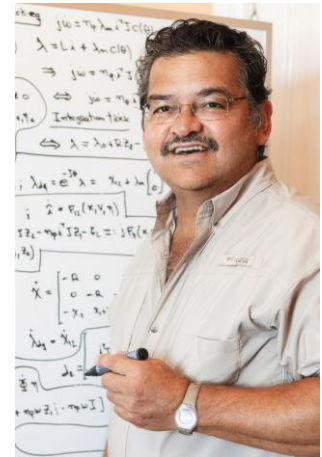
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Passivity-based Control of Physical Systems

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Abstract:

Energy is one of the fundamental concepts in science and engineering practice, where it is common to view dynamical systems as energy-transformation devices. This perspective is particularly useful in studying complex nonlinear hybrid systems by decomposing them into simpler subsystems which, upon interconnection, add up their energies to determine the full system's behavior. The action of a controller may be also understood in energy terms as another dynamical system typically implemented in a computer interconnected with the process to modify its behavior. The control problem can then be recast as a dynamical system and an interconnection pattern such that the overall energy function takes the desired form. Our objectives in this talk are threefold. First, to call attention to the fact that PBC hinges on the fundamental (and universal) property of energy conservation, hence is (in principle) applicable to all physical systems. Second, to provide the basic tools for its utilization on several physical systems. Third, to illustrate with some modern control applications how the use of energy concepts in PBC theory fosters collaboration with specialists from other disciplines, making the incorporation of process prior knowledge more systematic and providing a lingua franca for communication.

Biography:

Romeo Ortega obtained his BSc in Electrical and Mechanical Engineering from the National University of Mexico, Master of Engineering from Polytechnical Institute of Leningrad, USSR, and the Docteur D'Etat from the Politechnical Institute of Grenoble, France in 1974, 1978 and 1984 respectively. He then joined the National University of Mexico, where he worked until 1989. He was a Visiting Professor at the University of Illinois in 1987-88 and at the McGill University in 1991-1992, and a Fellow of the Japan Society for Promotion of Science in 1990-1991. He has been a member of the French National Researcher Council since June 1992. Currently he is in the Laboratoire de Signaux et Systemes in Paris. His research interests are in the fields of nonlinear and adaptive control, with special emphasis on applications. Dr. Ortega has published three books and more than 250 scientific papers in international journals, with an h-index of 64. He has supervised more than 30 PhD theses. He is a Fellow of the IEEE since 1999. He has served as chairman in several IFAC and IEEE committees and participated in various editorial boards of international journals.