



Romeo Ortega

2022 COMRob

XXIV ROBOTICS MEXICAN CONGRESS

Biography

Romeo Ortega was born in Mexico. He obtained his degree in Mechanical and Electrical Engineering at the Faculty of Engineering from UNAM, Mexico, his Master in Engineering from the Leningrad Polytechnic Institute, USSR, and the degree of Doctor of State from the Polytechnic Institute of Grenoble, France, in 1974, 1978 and 1984, respectively.

He worked at the Faculty of Engineering of the UNAM and the CINVESTAV of the IPN, until 1989. He was a Professor Visitor at the University of Illinois, USA, in 1987-1988, at McGill University in Canada in 1991-1992 and was a "Fellow" of the Japan Society for the Promotion of Science (JSPS) at the University of Sofia, Tokyo, Japan, in 1990-1991.

He worked as Research Director of the National Council for Scientific Research (CNRS) of France at the Supelec Signals and Systems Laboratory in Gif-sur-Yvette from 1992 to 2020. Currently, he is a full-time Professor at ITAM, Mexico. His research areas are nonlinear control and adaptable, with an emphasis on engineering applications.

Dr Ortega has published 6 books, more than 370 articles in international scientific journals, with an h-Index of 89 in Google Scholar and 70 in Scopus. He is an emeritus member of the National System of Researchers and member of the Mexican Academy of Sciences. He is an "IEEE Fellow Member" since 1999 ("Life" since 2020) and "IFAC Fellow" since 2016. He has collaborated as "Chairman" in various committees and IFAC and IEEE conferences, and has participated in various editorial groups of international journals. Currently, he is "Editor in Chief" of the "Int. J. Adaptive Control and Signal Processing" and "Senior Editor" from "Asian J. of Control", both by Wiley.

His last published book is: PID Passivity-based Control of Nonlinear Systems with Applications, R. Ortega, J. Romero, L. Borja and A. Donaire, J. Wiley and Sons, 2021.

Title:

Generation of Oscillations in Nonlinear Systems: Application to Nonholonomic Systems and Path Following

Abstract:

In this talk we show that a slight modification to the widely popular interconnection and damping assignment (IDA) passivity-based control and the immersion and invariance (I&I) methods—originally proposed for stabilization of equilibria of nonlinear systems—allows us to provide solutions to the more challenging orbital stabilization problem. For the IDA approach, two different, though related, ways how this procedure can be applied are proposed. First, the assignment of an energy function that has a minimum in a closed curve, i.e., with the shape of a Mexican sombrero. Second, the use of a damping matrix that changes "sign" according to the position of the state trajectory relative to the desired orbit, that is, pumping or dissipating energy. We show that ensuring orbital stabilization for mechanical systems is best formulated using a variation of the I&I technique and apply this result to generate smooth, time-invariant controllers for nonholonomic systems. Also, we apply this technique to the problem of path following, which is illustrated with underactuated mechanical systems and marine surface vessels.



comrob.2022

