M1: CONTROLLED SYNCHRONIZATION OF DYNAMICAL SYSTEMS

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Preliminary contents .—
This module is an introduction to the fairly broad multidisciplinary subject of synchronization from a control theory viewpoint; it roughly covers:

1. Basic topics
   - Stability of dynamical systems
   - Euler-Lagrange systems
   - Control of mechanical systems
   - Observer design
   - Oscillators, chaotic systems

2. Synchronisation
   - Master-slave synchronisation
   - Mutual synchronisation
   - Formation and Consensus
   - Blinking systems

3. Applications and examples
   - Controlled synchronisation of chaotic systems
   - Formation control of satellites,
     of marine vehicles
   - Hybrid synchronisation.

Public concerned.—
Control students and researchers will learn about fascinating control problems steaming from marine technology, mathematical physics and medicine. Physicists, engineers and applied mathematicians will learn tools of stability and control theory, the omnipresent discipline.

The lecturer .—
Antonio Loria was born in Mexico City in 1969. Electronics Engineer from ITESM, Monterrey, Mexico (1991); MSc and PhD in Control Engg. from UTC, France in (1993, 1996). He has successively held temporary research positions at Univ. of Twente (H. Nijmeijer, 1997), NTNU, Norway (T. I. Fossen, 1997) and CCEC—Univ. of California at Santa Barbara, (A. Teel, P. Kokotovic). Dr. Loria holds a tenure research position at the National Centre of Scientific Research (CNRS). He is with the "Laboratoire de Signaux et Systemes", Supelec, since Dec 2002 where he has a position as “Directeur de Recherche” (Senior Researcher). His research interests include: modelling and control of physical systems, stability analysis of (nonlinear time-varying) dynamical systems, control theory, chaos. He serves as associate editor for Systems and Control Letters, Automatica, IEEE Trans. Automatic Control, IEEE Trans. Control Systems Technology and as a member of the IEEE CSS Conf. Editorial board.