Program in Information and Management Systems

Graduate School of Comprehensive Scientific Research

Prefectural University of Hiroshima, Hiroshima, Japan

INVITED SERMINAR

Dr. Carlos Argáez

Science Institute, University of Iceland

General Algorithms to Properly Describe Complete Lyapunov Functions

Abstract:

Ordinary differential equations arise in a variety of applications, including climate modeling, electronics, predator-prey modeling, etc., and they can exhibit highly complicated dynamical behaviour. Complete Lyapunov functions capture this behaviour by dividing the phase space into two disjoint sets: the chain-recurrent part and the transient part. If a complete Lyapunov function is known for a dynamical system the qualitative behaviour of the system's solutions is transparent to a large degree.

The computation of a complete Lyapunov function for a given system is, however, a very hard task. In fact, under the analytic approach there is no general algorithm to construct a complete Lyapunov function and numerical methods must be considered.

In this talk, a general numerical algorithm is presented to construct complete Lyapunov function for any non-linear autonomous dynamical system along with significant improvements to properly isolate the dynamical behaviour from the recurrent one.

Biography:

Carlos Argáez received his bachelor's degree in Physics from the National Autonomous University of Mexico in 2008. After that, he participated as a major contributor to a research project on computational science at the University of Turin and the University of Morelos, Mexico. In 2013, he finished his PhD in Mathematics in the Dublin Institute of Technology, Ireland, under the topics of non-linear analysis and PDE's. From June 2014 to June 2016 he worked in the University of Iceland as research specialist. Currently he is a postdoctoral researcher in mathematics in the Dynamical System Group of the Science Institute, at the University of Iceland.

13:00 – 14:30, Thursday, October 10, 2019, Room 1321

Prefectural University of Hiroshima, Hiroshima, Japan

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