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INVESTMENTS IN EDUCATION DEVELOPMENT

Silesian University in Opava May 13, 2013

Silesian Mathematical Summer School in Opava, September 9-13, 2013

DYNAMICAL SYSTEMS: SELECTED TOPICS

First announcement

This activity is the second of the cycle of three summer schools on *Dynamical Systems and their Applications* organized by the Mathematical Institute in Opava during the period 2012-2014. The school is co-financed by the European Social Fund within the framework of the project *Development of Research Capacities of the Mathematical Institute of the Silesian University in Opava* [1]. For each year, the school program is designed to introduce the active researchers and doctoral students into two selected topics from the modern theory of Dynamical Systems. It includes 5 days of intensive lecturing combined with the exclusive possibility of direct communication with the leading mathematical experts. For this year, we have the following confirmed speakers:

Armengol Gasull (Universitat Autónoma de Barcelona)

Some dynamical tools for studying difference equations

Louis Block (University of Florida)

Topological entropy and one-dimensional dynamics

A more detailed description of the both courses can be found on the next pages.

The second summer school will take place from September 9 to September 13, 2013, in a hotel located in a beautiful part of the Morava-Silesian Beskydy Mountains or of the Jeseníky mountains (the exact place will be stated in the second announcement). Registration for the summer school will begin on May 20, 2013. No registration fee is required, and the school cost includes only the lodging expenses. Hotel prices are expected to be about 60 EUR (lodging + food) per person and day. Rooms in the hotel will be reserved for registrated participants. We recommend early registration due to the limited hotel capacities. A small number of scholarships for the Czech participants is available. The individual support will cover full board and lodging during the summer school period as well as the associated travel expenses. We especially encourage doctoral students from the Czech Republic to apply for these scholarships by sending a short motivation e-mail and CV at Karel.Hasik@math.slu.cz. The successful applicants will be informed via e-mail.

[1] For more information about the project visit http://projects.math.slu.cz/RVKMU/

Some dynamical tools for studying difference equations

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The aim of this course is to expose the results obtained during the last decade with my collaborators in Barcelona, A. Cima, V. Mañosa, F. Mañosas and X. Xarles, in our study of *rational difference equations*, together with the techniques that we have developed.

These are the subjects that I will treat:

- Darboux Theory of integrability of differential equations and discrete dynamical systems (DDS).
- Poincaré method for detecting non-integrability of DDS.
- Global periodicity and complete integrability.
- Studying complete integrable DDS through differential equations.
- Lyness autonomous difference equations.
- Non-autonomous difference equations.

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Topological Entropy and One-Dimensional Dynamics

Louis Block, University of Florida

Let (X, T) be a discrete topological dynamical system, i.e., let X be a nonempty compact Hausdorff space, and let $T : X \to X$ be a continuous map. The lectures will deal with topological entropy in this setting. The topological entropy associates to a dynamical system a nonnegative number which measures the complexity of the system. Roughly, it measures the exponential growth rate of the number of distinguishable orbits as time advances.

Topological entropy has played an important role in the study of dynamical systems, during the last 48 years. This concept has helped in the formulation of many conjectures and ideas, and provided some important structure in the basic problems of classifying dynamical systems up to topological conjugacy and describing all possible dynamics. In these talks we present a development of the basic properties of topological entropy, and a selection of the many results which involve this concept. We focus attention on the case where X is one-dimensional.

Some topics which will be included in the lectures are:

1. Equivalence of different definitions of topological entropy.
2. Basic properties of topological entropy.
3. Combinatorial dynamics and topological entropy.
4. Connections between topological entropy of maps and inverse limit spaces.
5. Topological entropy and minimal sets.
6. Topological entropy and transitivity.

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