DYNAMICAL SYSTEMS AND THEIR APPLICATIONS

Goal of the project

The main objective of this project is to create fundamental knowledge in dynamical systems theory and to apply this knowledge in formulating and analyzing real world models.

Short description of the project

The specific objectives, tasks and methodology of the project are contained in 5 WPs.

- In WP1 we develop new methods for the center and isochronicity problems for analytic and non-analytic systems, study bifurcations of limit cycles and critical periods.
- In WP2 we deal with the problem of integrability for some differential systems with invariant algebraic curves, study global attractors of almost periodic dynamical systems, Levitan/Bohr almost periodic motions of differential/difference equations.
- The main objective of WP3 is to study dynamics of some classes of continuous and discontinuous vector fields.
- WP4 deals with Hamiltonian systems in Plasma Physics, twist and non-twist area preserving maps, numerical methods, and the study of symmetries of certain kinds of k-cosymplectic Hamiltonians.
- The last WP tackles mathematical models in Neuroscience and Medicine.

Project implemented by

1. Politehnica University of Timisoara
2. West University of Timisoara
3. University of Craiova
4. Center for Applied Mathematics and Theoretical Physics, Slovenia
5. University of Maribor, Slovenia
6. Universitat Autonoma de Barcelona
7. Moldova State University
8. The Institute of Mathematics and Computer Science of the Academy of Sciences of Moldova
9. Tiraspol State University

Implementation period

01.10.2012 - 30.09. 2016

Main activities

- Develop new methods and algorithms for studying center and isochronicity problems.
- Investigations of reaction-diffusion equations.
- Study of differential and integral operators of non-integer order.
- Study global attractors of almost periodic dynamical systems and their topological structure.
- Study dynamics of certain classes of continuous and discontinuous vector fields.
- Study Hamiltonian systems with 1 ½ degrees of freedom and their discrete correspondents, namely systems generated by area-preserving maps.
- Investigations of ODE-based and map-based neuronal models.

Financed through/by

FP7

Results

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