UNIVERSITÀ DI TORINO

9 novembre 2023

Giornata di Benvenuto

per la presentazione dei nuovi componenti del Dipartimento di Matematica

Aula Magna di Palazzo Campana, Via Carlo Alberto 10, Torino

14:30 – 15:15	Diego Berti (RTDa in Nonlinear Differential Equations)
15:15 – 16:00	Nicola Soave (PA in Nonlinear Differential Equations)
16:00 – 16:30	Pausa caffè
16:30 – 17:15	Irene De Blasi (RTDa in Nonlinear Differential Equations)
17:15 – 18:00	Matteo Luca Ruggiero (RTDb in Mathematical Physics and Models for Applications)

Diego Berti: The Role of Convection in the Existence of Wavefronts for Population Dynamics with Bias in Movements.
In the first part, this talk provides an overview of recent results concerning the existence and the fine properties of traveling wave solutions for a reaction-diffusion equation with nonlinear convection and sign-changing diffusivity. The second part discusses the application of the theoretical outcomes to a new model describing the biased movement of a biological population that consists of isolated and grouped organisms. In particular, the existence of smooth solutions and long-term behavior (its survival or extinction) are highlighted. All results come from joint works with A. Corli (Ferrara) and L. Malaguti (Modena and Reggio Emilia).

Nicola Soave: On the Nodal Set of Solutions to Some Elliptic Problems.
We present some problems and some results related to the study of the zero level set of solutions to some elliptic problems, with particular emphasis on unique continuation, on the geometric structure, and of some applications.

Irene De Blasi: Analytical Methods for Celestial Mechanics.
Nonlinear Analysis techniques can be used to study many different problems coming from Celestial Mechanics. Models whose properties can be investigated in this way regard for example the motion of bodies subjected to the mutual gravitational attraction (N-body problem) or the dynamics of a geocentric satel- lite, which is influenced by Earth's attraction as well as of the other celestial bodies; a particular case is represented by galactic billiards, which can be stud- ied using classical techniques coming from the theory of Birkhoff billiards and area-preserving maps. During the seminar, some of these models will be pre- sented, along with the main analytical techniques that can be used to analyse their dynamical properties.

Matteo Luca Ruggiero: Gravitoelectromagnetic Analogies in General Relativity: Theory and Perspectives. In this talk we briefly review the gravitoelectromagnetic analogies that arise in General Relativity: they are powerful tools to explain peculiar general relativistic effects in terms of known results of classical electromagnetism. In particular, we focus on the perspective of measuring these effects on the Earth and in the Solar System, with emphasis on the detection of the magnetic-like component of the field of gravitational waves, and on the possible impact of these effects on galactic dynamics.