

Oliver J. Butterley

Smooth Ergodic Theory

Advanced Topics in mathematical Physics and Probability

20 ore (4 a settimana) nel periodo 29 April - 31 May 2024.

PROGRAMMA:

Smooth ergodic theory is the study of the statistical and geometric properties of measures invariant under a smooth transformation or flow.

Some highlights of the history of the subject include: the work of Birkhoff and von Neumann on ergodicity; Hadamard and E. Hopf on geodesic flows for negatively curved surfaces; Kolmogorov, Arnold and Moser with a perturbative theory to construct obstructions to ergodicity in Hamiltonian systems; Anosov and Sinai on hyperbolic systems.

The subject is broad and so in this short course we will focus on specific areas even though other areas are of equal relevance. Namely we will focus on smooth hyperbolic systems, identifying and studying invariant measures and obtaining statistical properties. We will also start along the road of using functional analytic techniques in order to work with these themes.

This course is aimed at providing participants with a solid working knowledge in the basic concepts, important techniques and examples in smooth ergodic theory, particularly in the direction of hyperbolic systems. The course aims to be of interest to those with research interests in various flavours of ergodic theory and dynamical systems, and its applications to study problems in combinatorics, number theory, homogeneous dynamics, differential equations, probability theory.