Giornata di Dipartimento

20 Dicembre 2024
Aula Gismondi

Programma

09:30 **Caffè di benvenuto**

10:30 **Jessica Elisa Massetti**
Recursive behaviors of Hamiltonian dynamical systems in finite and infinite dimension

11:10 **Pausa caffè**

11:40 Consegna del **premio Cuozzo** e seminario del vincitore 2024
Giovanni Italiano
Fibring Hyperbolic Manifolds and Hyperbolic Groups

13:00 **Pranzo di Natale**

14:30 **Lorenzo Dello Schiavo**
Is it possible to approximate a diffeomorphism with a permutation? (And how to do it?)

15:10 **Francesca Carocci**
Non Archimedean techniques in enumerative geometry

TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Abstracts

Jessica Elisa Massetti

Recursive behaviors of Hamiltonian dynamical systems in finite and infinite dimension

Nonlinear dynamical systems both in finite and infinite dimension are a fundamental instrument to understand/modelize physical phenomena, which often have recursive/undulatory nature: the rotation of a satellite, the behavior of a planetary system, the motion of the sea, the deflection of a beam, electromagnetic waves (light, radio waves)…
Many of these are modeled by Hamiltonian differential equations (ODEs in finite dimension or PDEs in the infinite case) and their mathematical description is often extremely complicated, characterized by a non-trivial interplay between stable and chaotic behaviors. A paradigmatic approach consists in studying the existence, stability, robustness and genericity of invariant manifolds that support a global dynamics which can be explicitly described. In the nearly integrable finite dimensional case, these objects are typically tori, have almost full measure, and support a Kronecker flow; this is a rather well established subject. In the infinite dimensional setting, very little is known and the results that one can obtain are strongly related to the boundary conditions of the PDE at stake.
In this talk I shall give an overview of this fascinating subject and focus on some specific results regarding the existence of solutions and long time stability.

Giovanni Italiano (premio Cuozzo)

Fibring Hyperbolic Manifolds and Hyperbolic Groups

Hyperbolic 3-manifolds fibring over the circle have been studied extensively in the previous fifty years, starting with Jørgensen first example in 1977, and culminating in Agol's celebrated virtual fibring theorem in 2012.
We will discuss some recent advancements in the study of the same phenomenon in higher dimensions. In particular, we construct an example of a fibring hyperbolic 5-manifold.
As a consequence, we show that being hyperbolic is not a hereditary property of subgroups, even when one limits themselves in considering only subgroups with the strongest finiteness assumptions: there is a type F subgroup of a hyperbolic group that is not hyperbolic.

Lorenzo Dello Schiavo

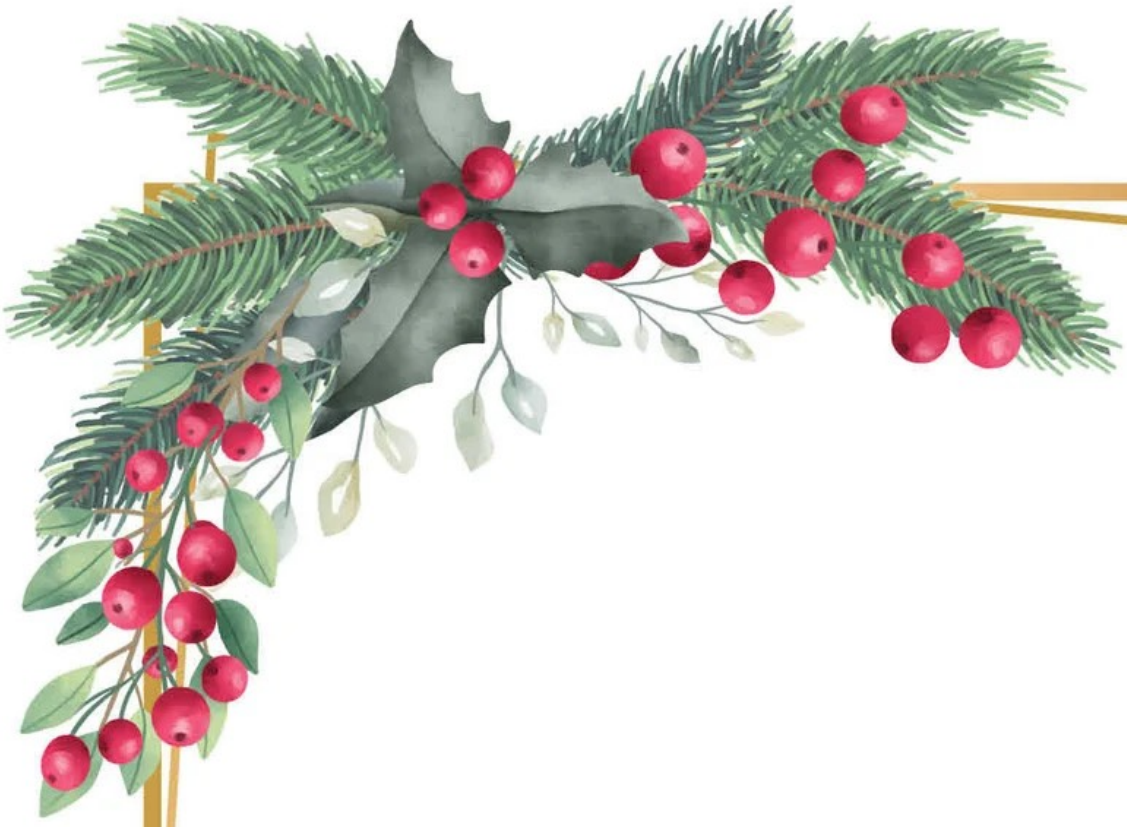
Is it possible to approximate a diffeomorphism with a permutation? (And how to do it?)

Motivated by a long-standing question by I.M. Gel'fand relative to the approximation of diffeomorphisms (say, on the flat torus) with permutations (say, reshuffling a partition induced on the flat torus by a lattice), we will discuss a stochastic approach to the study of faithful representations of the group of diffeomorphisms of a closed Riemannian manifold M in terms of "Brownian motions" on the space P(M) of all probability measures on M.
We will discuss several representations of these Brownian motions: in terms of their associated Dirichlet forms on L^2(P(M)), in relation with the L^2-Wasserstein geometry of P(M), in terms of marked particle systems, and as solutions to Dean—Kawasaki-type equations with white noise and singular drift.

Francesca Carocci

Non Archimedean techniques in enumerative geometry

There are two ways to think of a curve inside a smooth projective variety: as parameterized or as given by equations. The first point of view leads to the study of moduli spaces of stable maps and Gromov-Witten invariants; the second leads to the study of moduli spaces of sheaves and Donaldson-Thomas invariants. In this short seminar I will present some results obtained with different collaborators for both moduli of maps and moduli of sheaves. For spaces of maps, the techniques used are inspired by tropical geometry, and for spaces of sheaves they rely on p-adic integration.



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