



Seminario congiunto

Dipartimento di Matematica – Centro Internazionale per la Ricerca Matematica

GIOVEDÌ 13 GIUGNO ORE 15:00

Aula Seminari – Dipartimento di Matematica

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Moduli spaces of automorphism marked varieties: the case of curves and surfaces, and faithful representations of the absolute Galois group

ABSTRACT:

For several reasons it is interesting to consider moduli spaces of triples (X, G, a) where X is a projective variety, G is a finite group, and a is an effective action of G on X . If X is the canonical model of a variety of general type, then G is acting linearly on some pluricanonical model, and we have a moduli space which is a finite covering of a closed subspace M^G of the moduli space.

In the case of curves this investigation is related to the description of the singular locus of the moduli space M_g , for instance of its irreducible components (due by Cornalba), and of its compactification \bar{M}_g (done by the author). In the case of surfaces there is another occurrence of Murphy's law, as shown in my joint work with Ingrid Bauer: the deformation equivalence for minimal models S and for canonical models differs drastically (nodal Burniat surfaces being the easiest example).

In the case of curves, there are interesting relations with topology. Moduli spaces of curves with a group G of automorphisms of a fixed topological type have a description by Teichmüller theory, which naturally leads to conjecture genus stabilization for rational homology groups. I will then describe two equivalent descriptions of its irreducible components, surveying known irreducibility results for some special groups. A new fine homological invariant was introduced in my joint work with Loenne and Perroni: it allows to prove genus stabilization in the ramified case, extending a theorem of Dunfield and Thurston in the easier unramified case.

An important application is the following: In the 60's J. P. Serre showed that there exists a field automorphism s in the absolute Galois group Gal , and a variety X defined over a number field, such that X and the Galois conjugate variety X^s have non isomorphic fundamental groups, in particular they are not homeomorphic.

In a joint paper with I. Bayer and F. Grunewald we prove a strong sharpening of this phenomenon discovered by Serre. THM. If s is not in the conjugacy class of the complex conjugation then there exists a surface (isogenous to a product) X such that X and the Galois conjugate variety X^s have non isomorphic fundamental groups.

Moreover, we give some faithful actions of Gal , related among them, in particular, we show that Gal acts faithfully on the set of connected components of the (coarse) moduli spaces of surfaces of general type.

Referente: **Prof. Marco Andreatta**