

Columbia University

Algebraic Geometry Seminar

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VANISHING OF COHOMOLOGY CLASSES ON THE MODULI SPACE OF CURVES

There are various "vanishing" conjectures and theorems on the moduli space of (genus g n -pointed) curves, which roughly state that certain cohomology classes (tautological classes, the classes which arise naturally in geometry) vanish on some large open subset. I will describe a theorem (dimension i classes vanish away from the locus of curves with at least $2g - 2 + n + i$ rational components), from which the other vanishing conjectures and theorems (including Looijenga's theorem, Getzler's conjecture / Ionel's theorem, parts of conjectures of Faber and Faber-Pandharipande), and more, easily follow. In some sense, all the geometry behind the vanishing conjectures and theorems are contained in this one theorem; the rest is straightforward combinatorics. Also, this theorem suggests the centrality of a new stratification of the moduli space of curves by "number of rational components".

In the last few minutes, I will sketch the ideas behind the proof, which involve (virtual) localization of "Hurwitz classes" on the moduli space of curves, arising from maps from curves to the projective line.

This is joint work with Tom Graber.

Friday, April 12, 2002

2:30pm

Mathematics 417