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Abstracts of Plenary and Invited Lectures

Section:

4. Algebraic Geometry

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Cohomology of moduli spaces of stable curves

I will illustrate some recent progress in the calculation of the cohomology of $\overline{\mathcal{M}}_{g,n}$, the Deligne-Mumford-Knudsen compactification of the moduli space of genus g algebraic curves with n numbered punctures. In one direction, an elementary algebro-geometric calculation of the first, second, third, and fifth rational cohomology groups of $\overline{\mathcal{M}}_{g,n}$, for all g and n, has been given by Arbarello and myself. The proof uses a Lefschetz-type argument to do induction on g and n, starting from a few cases that can be disposed of directly. In a different direction, considerable progress has been made, mostly by Getzler, in understanding the cohomology ring of $\overline{\mathcal{M}}_{g,n}$ for $g = 1$ and for $g = 2$ and low n. In particular, remarkable new relations satisfied by the tautological classes in the fourth cohomology of $\overline{\mathcal{M}}_{g,n}$ have been found by Getzler for $g = 1, n = 4$, and by Belorusski and Pandharipande for $g = 2, n = 3$.