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Tautological relations and integrable systems

One of the most important manifestations of a deep relation between the geometry of the moduli spaces of stable curves and integrable systems, is the following.

Given a certain geometric object (a cohomological field theory or its generalization), there are two constructions of associated integrable systems of evolutionary PDEs. The first one is called the hierarchy of topological type (or the Dubrovin-Zhang hierarchy), and the second one is called the DR hierarchy (named after an important cohomology class, the DR cycle, used in its construction). In a joint work with Sergey Shadrin, we observe that various fundamental properties of these systems, which are still not proved, are controlled by a family of conjectural relations in the cohomology of the moduli spaces of curves. We managed to prove a part of these relations using a variation of a certain construction proposed by Liu and Pandharipande in 2011.