

The Negative Side of Witten's Conjecture

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In 2017, Norbury introduced a collection of cohomology classes on the moduli space of curves, and predicted that their intersection with psi classes solves the KdV hierarchy. In a joint work in progress with N. Chidambaram and E. Garcia-Failde, we consider a deformation of Norbury's class and, via the Givental–Teleman reconstruction theorem, we express such deformation in terms of kappa classes establishing new tautological relations recently proposed by Kazarian–Norbury. The recursive construction of these classes reduces in the limit to certain Virasoro constraints satisfied by Norbury's class, equivalent to the KdV hierarchy. This result corresponds to spin -2 intersection numbers. In the same work, we establish the analogous results for general negative spin: we introduce some new cohomology classes, analogous to the Witten r -spin classes, get tautological relations through the Givental–Teleman reconstruction, and prove W -constraints equivalent to the r -KdV hierarchy.

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