Idempotents on the big phase space

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Abstract
The big phase space for Gromov-Witten invariants is a product of infinitely many copies of the space of cohomology classes of the underlying symplectic manifold. We can define an associative product among vector fields on the big phase space which generalizes the product in the quantum cohomology. Idempotents for this product were introduced to replace Dubrovin’s canonical coordinates on the Frobenius manifold defined by quantum cohomology. We use idempotents to study universal equations for higher genus Gromov-Witten invariants which arise from relations in the tautological rings of moduli spaces of stable curves. When the manifolds have semisimple quantum cohomology, we can solve genus-1 and genus-2 generating functions for the Gromov-Witten invariants using idempotents.