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Polyhedra for V -infinity algebras, string topology, and moduli spaces

Where associahedra are polyhedra that organize operations and relations in an A_∞ algebra, associpahedra are polyhedra that organize operations and relations in a V_∞ algebra, a homotopy version of an associative algebra that has a compatible co-inner product. Associpahedra appear in the study of spaces of string topology operations—both on the chains or homology of the loop space of a closed, oriented manifold (the topological side) and on the Hochschild cochains or cohomology of a V_∞ algebra (the algebraic side). We describe the role associpahedra play on both sides and present progress on a conjecture relating these spaces of operations to the moduli space of Riemann surfaces.