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Abstracts of Short Communications and Posters

Section:

6. Topology

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On Quantum and Finite Type Invariants of Homology 3-Spheres
In 1995, we (joint work with J. Murakami and T. Ohtsuki) constructed an invariant Ω of 3-manifolds with values in the space of 3-valent graphs. The construction utilizes the Kontsevich integral which is a universal finite type invariant of *links*. Later the author showed that Ω is a universal finite type invariant of *homology 3-spheres.*

For $\mathfrak{g} = sl_2$, Ohtsuki extracted a power series invariant $\tau^{\mathfrak{g}}$ of homology 3-spheres from quantum $\mathfrak{g}$-invariants (the Witten-Reshetikhin-Turaev invariants) at roots of unity. This formal power series can be regarded as the perturbative expansion of the Witten path integral. We generalize this result, constructing $\tau^{\mathfrak{g}}$ for other simple Lie algebras, and explain the relation between the universal invariant Ω and $\tau^{\mathfrak{g}}$. We will also present some properties of the Kontsevich integral and Ω, including symmetry and integrality properties.