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Representations of the Kauffman skein algebra I: invariants and miraculous cancellations

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(Submitted on 7 Jun 2012)

We study finite-dimensional representations of the Kauffman skein algebra of a surface S. In particular, we construct invariants of such irreducible representations when the underlying parameter q is a root of unity. The main one of these invariants is a point in the character variety consisting of group homomorphisms from the fundamental group of S to $SL_2(\mathbb{C})$, or in a twisted version of this character variety. The proof relies on certain miraculous cancellations that occur for the quantum trace homomorphism constructed by the authors. These miraculous cancellations also play a fundamental role in subsequent work of the authors, where novel examples of representations of the skein algebra are constructed.

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