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Brauer loop scheme and orbital varieties

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Abstract

The Brauer loop scheme is a certain affine scheme in the space of complex matrices. It is intimately related to a Markov process based on the Brauer algebra. We use the quantum integrability of the Markov process (under the form of the quantum Knizhnik-Zamolodchikov equation) to derive results on the “multidegrees” (equivariant Hilbert polynomials) of the irreducible components of the Brauer loop scheme. We show that in a special limit we recover certain orbital varieties and thus Joseph polynomials, as well as double Schubert polynomials.