

Second fundamental theorem of invariant theory for orthogonal and symplectic groups

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Abstract: The first and second fundamental theorems (FFT and SFT) of classical invariant theory are respectively concerned with generators and relations for invariants of group actions. Let G be the orthogonal group $O(V)$ or the symplectic $Sp(V)$, and let $\text{End}(V^{\otimes r})$ be the algebra of endomorphisms of $V^{\otimes r}$. The FFT of the invariant theory of G in this setting states that there is a surjective algebra homomorphism from the Brauer algebra of degree r to the subalgebra of invariants in $\text{End}(V^{\otimes r})$. However, the SFT remained elusive in this setting. We will develop an SFT by studying a category of Brauer tangle diagrams, and discuss the generalization of the results to the corresponding quantum groups. This is joint work with Gus Lehrer.

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