THE FIRST FUNDAMENTAL THEOREM OF INVARIANT THEORY FOR QUANTUM SUPERGROUPS

R. B. ZHANG
THE UNIVERSITY OF SYDNEY

Abstract. Let $\mathrm{U}_q(\mathbb{F})$ be either the quantum general linear supergroup or modified quantum orthosymplectic supergroup over the field $\mathbb{F}$ of rational functions of q, and let V_q be the natural module for $\mathrm{U}_q(\mathbb{F})$. Denote by $\mathscr{T}_q(\mathbb{F})$ the full subcategory of the category of finite dimensional $\mathbb{Z}_2$-graded $\mathrm{U}_q(\mathbb{F})$-modules with objects being repeated tensor products of V_q and its dual. We show that there is a tensor functor from the category of ribbon graphs to $\mathscr{T}_q(\mathbb{F})$, which is full and preserves ribbon category structures. This in particular implies that the endomorphism algebra $\mathrm{End}_{\mathrm{U}_q(\mathbb{F})}(V_q^{\otimes r})$ is a homomorphic image of the Hecke algebra of degree r if $\mathrm{U}_q(\mathbb{F})$ is the quantum general linear supergroup, and that of the Birman-Wenzl-Murakami algebra of degree r with appropriate parameters if $\mathrm{U}_q(\mathbb{F})$ is the quantum orthosymplectic supergroup. This is joint work with Gus Lehrer and Hechun Zhang.