

Abstract

A remarkable success of invariant theory in recent decades is the construction of topological invariants of knots from the study of quantum group actions. Many interesting new algebras presented in terms of tangle-like diagrams emerged in the process, which are of central importance in representation theory and are in the focus of current research.

This talk is an elementary introduction to diagram algebras and the important role which they play in invariant theory. We will first analyse the Jones polynomial of knots to uncover the underlying algebraic structure, the Templey-Lieb algebra. Then we generalise the analysis to other knot invariants to treat their underlying diagram algebras in a uniform manner. Finally, we discuss the representations of the diagram algebras used in the construction of knot invariants, and explain the construction as an aspect of the first fundamental theorem of invariant theory for quantum groups. At the end of the talk, we will allude to some very recent work on affine Templey-Lieb algebras.