Diagram algebras and applications to Kazhdan–Lusztig theory

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Abstract: Kazhdan–Lusztig polynomials are subtle objects that arise naturally in the context of Hecke algebras associated to Coxeter groups. Unfortunately, computing these polynomials efficiently quickly becomes difficult, even in finite groups of moderate size. Computing the Kazhdan–Lusztig polynomials would be simplified if one could quickly compute the leading coefficients. In this talk, I will discuss how methods from the theory of diagram algebras can be used to non-recursively compute the leading coefficients of certain Kazhdan–Lusztig polynomials. In particular, we will focus our attention on Hecke algebras of types A, B, and affine C. Moreover, we will relay the current state of affairs of diagram algebras as tools for exploring Kazhdan–Lusztig theory.