A diagrammatic representation of an affine C Temperley–Lieb algebra

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Abstract: In this talk, I will present an associative diagram algebra that is a faithful representation of a particular Temperley–Lieb algebra of type affine C, which has a basis indexed by the fully commutative elements of the Coxeter group of the same type. The Coxeter group of type affine C contains an infinite number of fully commutative elements, and so the corresponding Temperley–Lieb algebra is infinite dimensional. With the exception of type affine A, all other generalized Temperley–Lieb algebras with known diagrammatic representations are finite dimensional. In the finite dimensional case, counting arguments are employed to prove faithfulness, but these techniques are not available in the affine C case. To prove faithfulness, I had to classify the fully commutative elements in Coxeter groups of types B and affine C that are irreducible under weak star operations. The classification of these irreducible elements provides the groundwork for inductive arguments that are used to prove faithfulness. The classification of the weak star irreducible elements of type B also verifies C.K. Fan's unproved claim about cancelable elements in a Coxeter group of type B. The results of this thesis will be used to construct a trace on the Hecke algebra of type affine C, which will then be used to compute leading coefficients of certain Kazhdan–Lusztig polynomials in a non-recursive way.