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Nonsymmetric Askey-Wilson Polynomials and Q-Polynomial Distance-Regular Graphs

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Roughly speaking, nonsymmetric Askey–Wilson polynomials are eigenfunctions of the Cherednik-Dunkl operator and form a linear basis of the vector space of the Laurent polynomials in one variable. In this talk, I define a finite sequence of certain Laurent polynomials in one variable, using a Q-polynomial distance-regular graph that contains a Delsarte clique. I prove the orthogonality relations for these polynomials, using a representation for a universal double affine Hecke algebra of rank 1. And I show how my Laurent polynomials can be viewed as a finite, combinatorial analogue of the nonsymmetric Askey–Wilson polynomials.

I will give some basic background concerning Q-polynomial distance-regular graphs and explain the significance of the connection between Q-polynomial distance-regular graphs and the double affine Hecke algebra of rank 1 that I found. This talk does not require any background in Hecke algebras. It will be accessible to any graduate and undergraduate students with a knowledge of linear algebra.
