BI-CO MATHEMATICS COLLOQUIUM

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*"*Combinatorics of finite fields and symmetric functions*"*

Monday, December 10, 2012

Talk at 4:00 – E309
Tea at 3:00 – KINSC Math Lounge, H208

Abstract:

I will begin by introducing the q-binomial coefficient, which is a q-analogue of the regular binomial coefficient, and counts subspaces in vector spaces over a field with q elements. The q-multinomial coefficients are defined analogously, and count flags of subspaces. I will then give some interesting recursions of sums of these quantities. The q-binomial coefficients are then used to define the Rogers-Szego polynomials in a single variable, which have played an important role in number theory as well as the theory of orthogonal polynomials. Multivariate Rogers-Szego polynomials are defined using q-multinomial coefficients, and these polynomials have nice recursions similar to those introduced in the beginning of the talk. Finally, I will give a new result, obtained in joint work with undergraduate Stephen Cameron from William and Mary, which is a product formula for multivariate Rogers-Szego polynomials. This formula has an interesting interpretation in terms of symmetric functions, and has the potential for further generalization in this direction.

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