

BI-CO MATHEMATICS COLLOQUIUM

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"Peaks and descents of permutations"

Monday, September 12, 2016

Talk at 4:00 – H109

Tea at 3:30 – KINSC Math Lounge, H208

Abstract:

Given a permutation π in S_n , we say an index i is a peak if $\pi(i-1) < \pi(i) > \pi(i+1)$. Let $P(\pi)$ denote the set of peaks of π . Given any set S of positive integers, Billey, Burdzy, and Sagan showed that the number of permutations in S_n with peak set S is given by a polynomial (depending on S) times a power of two. They conjectured that the coefficients of this polynomial expanded in a binomial coefficient basis centered at $\max(S)$ are all nonnegative. In this talk we prove that their "positivity conjecture" is true. It remains an open question to find a combinatorial meaning of these non-negative coefficients. Near the end of the talk, we will discuss various current developments regarding this topic, including some similar questions replacing "peaks" by "descents." No prerequisites.

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