Marshall University Department of Mathematics
Advanced Research Initiative

Invited Speaker

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Professor of Mathematics
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Counting Permutations with Calculus

Tuesday, October 11, 2016 • Smith Hall 516 • 4:00pm

Abstract

A permutation $\pi = \pi_1\pi_2\cdots\pi_n$ is a list of the elements 1 through n in some order. A permutation is alternating if the elements zig-zag, that is, $\pi_1 < \pi_2 > \pi_3 < \cdots$. We prove a classic formula for the number of alternating permutations using the interplay of geometry and calculus. Using the same techniques we also study the number permutations with no double ascents, that is, there is no index i such that $\pi_i < \pi_{i+1} < \pi_{i+2}$. Unfortunately, this last case becomes messy and leads to open questions where else these techniques can be applied.