RUTGERS EXPERIMENTAL MATHEMATICS SEMINAR

Title: Sharing Pizza in n Dimensions

Speaker: Richard Ehrenborg, University of Kentucky

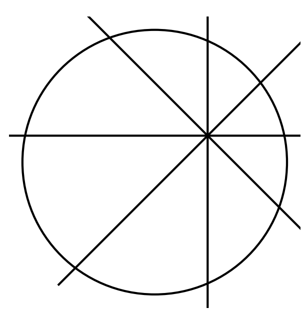
Date: Thursday, March 31st, 2022

Time: 5:00pm–5:48pm

Place: zoom

Short abstract: We introduce and prove the n-dimensional Pizza Theorem. This is joint work with Sophie Morel and Margaret Readdy.

Long abstract: We introduce and prove the n-dimensional Pizza Theorem. Let $\mathcal{H}$ be a real n-dimensional hyperplane arrangement. If K is a convex set of finite volume, the *pizza quantity* of K is the alternating sum of the volumes of the regions obtained by intersecting K with the arrangement $\mathcal{H}$. We prove that if $\mathcal{H}$ is a Coxeter arrangement different from A_1^n such that the group of isometries W generated by the reflections in the hyperplanes of $\mathcal{H}$ contains the negative of the identity map, and if K is a translate of a convex set that is stable under W and contains the origin, then the pizza quantity of K is equal to zero. Our main tool is an induction formula for the pizza quantity involving a subarrangement of the restricted arrangement on hyperplanes of $\mathcal{H}$ that we call the *even restricted arrangement*. We get stronger results in the case of balls. We prove that the pizza quantity of a ball containing the origin vanishes for a Coxeter arrangement $\mathcal{H}$ with $|\mathcal{H}| - n$ an even positive integer. This is joint work with Sophie Morel and Margaret Readdy.



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