Queen's Algebraic Geometry
— Seminar —

Conjugate reciprocal polynomials with all roots on the unit circle

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Abstract

Given a polynomial $f(z)$ in $\mathbb{C}[z]$, we can create the polynomial $f^*(z)$ whose coefficients are obtained from the coefficients of f by reversing their order followed by complex conjugation. The polynomial f is called conjugate reciprocal if $f = f^*$. I'll discuss how the set of conjugate reciprocal polynomials of degree N with all roots on the unit circle is naturally associated to a subset of $\mathbb{R}^{N-1}$. I'll discuss the geometry, topology and Lebesgue measure of this set. Specifically, it is homeomorphic to the $N-1$ ball with the structure of a colored simplex and has an isometry group isomorphic to the dihedral group of order $2N$. The volume of the set is equal to the volume of the $N-1$ ball of radius 2.

Monday, October 2, 2006
4:30pm – 5:30pm
115 Jeffery Hall