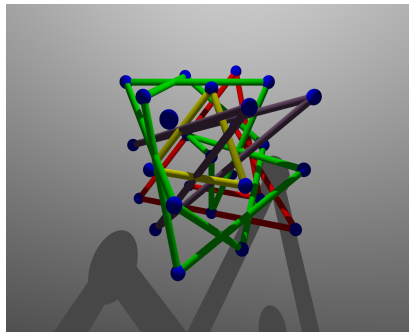# Student Research Talks (StReeTs)

Mason Experimental Geometry Lab (MEGL)

Longest Orbits over Varieties of a Generalized Markoff Equation over Finite Fields

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Abstract

The automorphism group of the polynomial $k(x, y, z) = x^2 + y^2 + z^2 - xyz - 2$ over a finite field $\mathbb{F}_q$ has a subgroup Γ, consisting of polynomial automorphisms, whose orbit lengths are of particular fascination. The group Γ is generated by the automorphisms ι, τ, η and acts on the variety $\mathbb{V}(k - \lambda)$, for λ in $\mathbb{F}$. We are interested in the length of the longest orbit, denoted $\mathcal{L}_{\langle w \rangle}(q, \lambda)$, for a fixed λ and prime power q, where $\langle w \rangle$ is the cyclic subgroup generated by w in Γ. The evaluation of our $\mathcal{L}$ function is complete for ι, τ, $\iota\tau$, and $\eta\iota$.

A motivating conjecture is that these automorphisms will act transitively (in a certain measure sense) on the variety as q tends toward infinity. We hope to gain insight into how the gorup action is approaching transitivity by studying automorphisms of exceptionally large order.

Date: Friday, September 1, 2017
Time: 2:30pm–3:30pm
Place: Exploratory Hall 4106

Pizza and soda will be served at the presentation.

For further information or for special accommodations, please contact Sean Lawton via email at `seanlawton@gmail.com` or drop by the MEGL.