

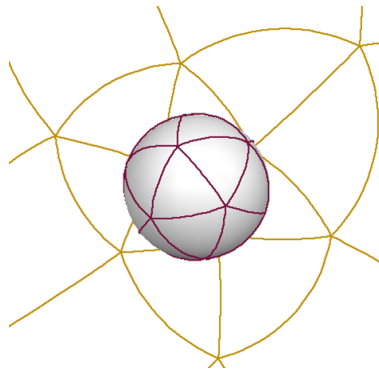
Secret Student Seminar

Experimental Algebra & Geometry Lab

Symmetric Representations for Modular Forms

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Abstract

Modular forms are functions defined by their transformation properties. The purpose of this talk is to show that subgroups of Klein's automorphism groups induce symmetries for homogeneous polynomial representations of modular forms. These symmetries result from actions of congruence subgroups of $SL(2, \mathbb{Z})$, the set of 2×2 matrices with determinant 1. Vector-valued modular forms of modified theta constants will be introduced and shown to satisfy transformation formulas induced by the action of $SL(2, \mathbb{Z})$ on the upper half plane. The matrices that result from these transformations are the generators for Klein's symmetry groups for the Projected Icosahedron and the Klein Quartic. Certain subgroups of $SL(2, \mathbb{Z})$ will be shown to permute generators for corresponding vector spaces of modular forms, in turn inducing symmetries in polynomial representations for modular forms. This talk will be computational in nature. Sage and Mathematica will be used to construct required representations for generators of subgroups of $SL(2, \mathbb{Z})$.

Date: Friday, September 13, 2013

Time: 3:00pm–4:00pm

Place: MAGC 1.302

Pizza and soda will be served at the presentation.