Department of Mathematics and Statistics Colloquium

Student Research Presentations

Small Landau-Ginzburg Theories

Sean Gholson

Abstract: We classify (0, 2) Landau-Ginzburg theories that can flow to compact IR fixed points with equal left and right central charges strictly bounded by 3. Our result is a (0, 2) generalization of the ADE classification of (2, 2) Landau-Ginzburg theories that flow to $N = 2$ minimal models. Unitarity requires the right-moving supersymmetric sector to fall into the standard $N = 2$ minimal model representations, but the left-moving sector need not have supersymmetry. The Landau-Ginzburg realizations provide a simple way to compute the chiral algebra and other characteristics of these fixed points. While our results pertain to isolated superconformal theories, tensor products lead to (0, 2) superconformal theories with higher central charge, and the Landau-Ginzburg realization provides a model for a class of marginal and relevant deformations of such theories.

Companion Matrices for Recursively Defined Polynomials

Tyler Hain

Abstract: Given a degree n monic polynomial $p(z)$, a companion matrix for p is an $n \times n$ matrix A such that $\det(zI - A) = p(z)$. In this talk, we'll discuss iterative methods for constructing companion matrices for recursively defined monic polynomials and explore applications of these matrices, including connections to complex dynamics.

Combining RNA-Seq Data Across Studies to Strengthen Biomarker Detection

Sarah Szvetecz

Abstract: In this project we use data from two specific RNA-seq studies to investigate retina developmental biology. These studies are done in two different labs using different protocols, as such they cannot be combined directly. We apply a normalization method on both studies to account for differences in the two studies. We perform gene expression analysis on the transformed data to identify genes that could affect the retina development process.

Monday, April 22 at 3:50 in Roop 103

Refreshments at 3:30