MEMORIAL
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MATHEMATICS AND STATISTICS
Faculty of Science

Algebra Seminar

Representation varieties, point counting, and characters of finite general linear groups

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Abstract:

Given a Riemann surface X (i.e., a compact, complex curve), we define the character variety $M_n := \mathrm{Hom}(\pi_1(X), GL_n(\mathbb{C}))/GL_n(\mathbb{C})$ to be the set of homomorphisms from the fundamental group $\pi_1(X)$ to the complex general linear group $GL_n(\mathbb{C})$. This M_n is a very rich geometric object with many applications in topology, representation theory, and mathematical physics.

In 2008, Hausel and Rodriguez-Villegas calculated geometric invariants of M_n (the so-called E-polynomial) by counting homomorphisms from $\pi_1(X)$ into general linear groups $GL_n(\mathbb{F}_q)$ defined over a finite field $\mathbb{F}_q$. Their method makes use of the character theory of $GL_n(\mathbb{F}_q)$. In this lecture, I will discuss recent work with Michael Lennox Wong applying their techniques to a "real" analogue of M_n.