

Queen's Algebraic Geometry — Seminar —

ON CURVE SINGULARITIES, TORUS KNOTS AND TRIANGULAR GROUPS

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Abstract

The center of the discussion is the geometric structure of the complement of a (p, q) -torus knot in the 3-sphere, modeled on the simply connected $\widetilde{\mathrm{SL}}_2(\mathbb{R})$. The knot is viewed as the intersection of the affine variety $z^q + w^p = 0$ with the unit 3-sphere centered in the singularity. The \mathbb{C}^* -equivariance of this singularity provides two dual fibration structures in the knot complement. These give a good understanding of the fundamental group, and suggest its realization as a discrete subgroup of $\widetilde{\mathrm{SL}}_2(\mathbb{R})$, contained in the pre-image of a triangular Fuchsian group $\Gamma(p, q, \infty)$. The rich geometry of triangular groups allows to reconstruct the fibrations and obtain the requested diffeomorphism between the coset space and the knot complement.

In this setting, one can illustrate some interesting questions and results concerning singularities, resolutions, Schottky groups, automorphic forms, Alexander modules and polynomials, three-manifolds.

Monday, February 25, 2008
4:30pm – 5:30pm
319 Jeffery Hall