NUMBER THEORY
SEMINAR

Brill-Noether Theory of k-Gonal Curves

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Abstract: ¡p¿Given a curve C the Brill-Noether variety $W_d^r(C)$ parameterizes line bundles on C of degree d and rank at least r. When C is general in the moduli space $\mathcal{M}_g$ of smooth genus g curves these varieties exhibit a number of "desirable" geometric properties and their dimension can be computed explicitly in terms of g, r, and d. However, these varieties exhibit bizarre behaviour when one considers curves that are not general in $\mathcal{M}_g$. Our goal will be to understand how one can still study line bundles on these non-generic curves, called k-gonal curves. We begin with a study of the Brill-Noether varieties $W_d^r(C)$ and then consider a new variety $W^\mu(C)$ that parameterizes line bundles governed by the discrete invariant μ.¡/p¿

¡p¿Using machinery from tropical geometry and Berkovich spaces we may encode families of line-bundles as a special family of tableaux known as k-uniform displacement tableaux. We will discuss how k-uniform displacement tableaux on rectangular partitions parameterize $W_d^r(C)$. Furthermore, we will push this combinatorial analysis to a family of partitions known as k-cores to parameterize the varieties $W^\mu(C)$ explicitly in terms of k-uniform displacement tableaux. ¡/p¿

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