

UGA Algebra Seminar — Sept. 24, 2007

Speaker: Bobbe Cooper (UGA)

Title: Kazhdan-Lusztig cells and tilting modules for GL_n

Let G be a reductive algebraic group scheme defined over the finite field \mathbb{F}_p , with Frobenius kernel G_1 . The tilting modules of G are defined as rational G -modules for which both the module itself and its dual have good filtrations. In 1997, J. E. Humphreys conjectured that the support varieties of certain tilting modules for regular weights should be given by the Lusztig bijection between two-sided Kazhdan-Lusztig cells of the affine Weyl group and nilpotent orbits of G , when $p \geq h$. In this talk, we present a conjecture for the support varieties of tilting modules when $G = GL_n$. Our conjecture is equivalent to Humphreys' conjecture for $p \geq h$ and regular weights, but our formulation allows us to consider small p or singular weights as well. We will discuss two useful methods of calculating the two-sided cells of the affine Weyl group, and give a survey of results on tilting modules obtained using these methods, including the case $p = 2$, and tilting modules whose support variety corresponds to a hook partition. In the case $p = 2$, we verify the conjecture by S. Donkin for the support varieties of tilting modules.