

Oberseminar Algebra, 21.11.2017

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Title: On equations defining the affine Grassmannian of  $SL_n$ .

Abstract: The affine Grassmannian  $Gr$  of a semisimple Lie group  $G$  is an important infinite dimensional variety that appears in geometric representation theory. This talk concerns the projective geometry of  $Gr$  when  $G=SL_n$ . More precisely, in this case  $Gr$  naturally embeds into the Sato Grassmannian, which is a limit of finite dimensional Grassmannians  $Gr(n,2n)$  as  $n \rightarrow \infty$ . We are interested in the equations defining the embedding  $Gr \subset SGr$ .

Kreiman, Lakshmibai, Magyar and Weyman constructed linear equations on  $SGr$  which vanish on  $Gr$  and conjectured that these equations suffice to cut out the affine Grassmannian. We recently proved this conjecture by reducing it to a question about finite dimensional Grassmannians. I'll describe our method of proof and mention some conjectures that arise from our work. I'll motivate this discussion by relating our work to the problem of describing the equations of an interesting class of singular varieties: the nilpotent orbit closures in positive characteristic.