Meeting: 1007, Santa Barbara, California, SS 5A, Special Session on Noncommutative Geometry and Algebra

1007-14-58 **Adam Nyman*** (`nymana@mso.umt.edu`), Math Building, University of Montana, Missoula, MT 59812. *Grassmannians of two-sided vector spaces.*

We parameterize two-sided subspaces of two-sided vector spaces, and study the geometry of the resulting moduli space. More precisely, let $k \subset K$ be an extension of fields, and give $V = K^n$ a $K \otimes_k K$-module structure by letting the left multiplication of K on V be the usual scalar multiplication and letting the right multiplication of K on V be induced by a ring homomorphism $\phi : K \to M_n(K)$. We parameterize ϕ-invariant subspaces of V with fixed rank, $[W]$, by a projective scheme, $\mathbb{G}_\phi([W], V)$. We compute the tangent space to $\mathbb{G}_\phi([W], V)$, and we study the structure of $\mathbb{G}_\phi([W], V)$ in two cases. In case K is infinite, $[W]$ has no repeated factors, and V is semisimple, we construct affine open subschemes of $\mathbb{G}_\phi([W], V)$ which cover K-valued points of $\mathbb{G}_\phi([W], V)$. In case K is finite-dimensional and separable over k, we prove that $\mathrm{Ext}^1_{K \otimes_k K}(V, V) = 0$ by studying the cohomology of bimodules over noetherian schemes. As a consequence, we recover the classical result that when K/k is finite and Galois, $\mathbb{G}_\phi([W], V)$ is the product of classical Grassmannians. (Received January 24, 2005)