

SEGRE INVARIANTS OF PRINCIPAL BUNDLES OVER A CURVE

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ABSTRACT. Given a vector bundle V over a curve X , for each rank $1 \leq n \leq rkV$ the Segre invariant $s_n(V)$ encodes the degree of a maximal rank n subbundle of V which, in turn, measures whether V can be destabilized by rank n subbundles, hence provides information about the 'stability degree' of V . Given a connected reductive algebraic G and E a G -principal bundle over a curve X , for each parabolic subgroup $P \subset G$ we define a Segre invariant $s_P(E)$, generalising $s_n(V)$ for $G = GL_n$. We show that the function s_P is semicontinuous in families of G -bundles, therefore defining stratifications on the moduli space of G -bundles over X , and study their invariance properties for surjective homomorphisms $\phi : G \rightarrow H$. This is joint work currently in progress with George H. Hitching.

Keywords: Segre invariant, principal bundles, moduli spaces, stratifications.

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REFERENCES

- [1] H. Lange and M. S. Narasimhan, *Maximal subbundles of rank two vector bundles on curves*, Math. Ann. **266**(1) (1983) 55–72.
- [2] L. Brambila-Paz and H. Lange, *A stratification of the moduli space of vector bundles on curves*, J. Reine Angew. Math. **494** (1998) 173–187.
- [3] Y. I. Holla and M. S. Narasimhan, *A generalisation of Nagata's theorem on ruled surfaces*, Comp. Math. **127** (2001) 321–332.
- [4] I. Choe and G. H. Hitching, *Lagrangian subbundles of symplectic vector bundles over a curve*, Math. Proc. Cambridge Phil. Soc. **153** (2012) 193–214.
- [5] G. H. Hitching and A. Zamora, *Segre invariants of principal bundles over a curve*, in preparation.

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