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Understanding Segre invariants via higher secant varieties

The moduli space of G -bundles over an algebraic curve is stratified by the generalized Segre invariants, which measures the degree of maximal subbundles. For the cases $G = \mathrm{GL}(n)$, $\mathrm{Sp}(2n)$, and $\mathrm{O}(n)$, we observe that the Segre stratification matches with that coming from the higher secant varieties of certain subvarieties in the extension spaces. From this observation, together with the non-defectivity of the secant varieties, we prove the sharp upper bound on the generalized Segre invariants. This talk is based on a series of joint works with George H. Hitching.