

Title: E-polynomials of Character Varieties of Free Groups

Abstract: with $G = GL(n, C)$, let $\mathcal{X}_\Gamma G$ be the G -character variety of a given finitely presented group Γ , and let $\mathcal{X}_\Gamma^{irr} G \subset \mathcal{X}_\Gamma G$ be the locus of irreducible representation conjugacy classes. We provide a concrete relation, in terms of plethystic functions, between the generating series for Serre (also called E -) polynomials of $\mathcal{X}_\Gamma G$ and the one for $\mathcal{X}_\Gamma^{irr} G$. The proof uses a natural stratification of $\mathcal{X}_\Gamma G$ coming from affine GIT and the combinatorics of partitions. For the case $\Gamma = F_r$, the free group of rank r , using geometric methods and the language of partitions, we prove that $E(\mathcal{X}_r SL_n) = E(\mathcal{X}_r PGL_n)$, for any $n, r \in N$, settling a conjecture of Lawton-Muñoz. Using this relation, additional explicit computations of polynomials are also provided. This is based on joint work with C. Florentino and A. Zamora.