Arithmetic Dynamics on Character varieties

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Abstract

For a reductive algebraic group over $\mathbb{Z}$, the *G-character variety* of a finitely presented group Γ parametrizes the set of closed conjugation orbits in $\mathrm{Hom}(\Gamma, G)$. The dynamics of the action of the group of outer automorphisms, $\mathrm{Out}(\Gamma)$, on the finite field $(\mathbb{F}_q)$ points of the character variety is explored. We provide a criterion for $\mathrm{Out}(\Gamma)$-action to be non-transitive on G-character variety of Γ. We prove that the action is transitive on the set of epimorphisms from Γ to G when Γ is of free type. The action is said to be *asymptotically transitive* if the ratio of the number of points in the orbit to that of the character variety equals one as $q \to \infty$. Time permitting, we will also show that the action is not asymptotically transitive on $\mathrm{SL}_n(\mathbb{F}_q)$ of $\mathbb{Z}^r$ for $n = 2, 3$.