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Character Varieties in Knot Theory

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Abstract:
Given an algebraic group G and a knot K ⊂ S^3, we define the G-character variety of K as the moduli space of representations ρ : π1(S^3 − K) → G of the knot group into G. The importance of these varieties lies in the fact that their study provides in a natural way many knot invariants.

In this talk, we will introduce one of the most important of these invariants, the E-polynomial, exposing the techniques used to study them, as well as the main known results, focusing especially on the case of torus knots. In this context, being able to distinguish when two representations are isomorphic becomes crucial. For facing this problem, we will introduce the configuration space of orbits, a variety formed by tuples of pairwise non-isomorphic representations.

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