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E-polynomials of singular character varieties

A nice application of the Weil conjectures is to compute the Betti numbers of smooth complex projective varieties by counting points over a finite field. For singular or non-compact varieties one is lead to consider the "virtual Hodge numbers" encoded by the E-polynomial, a refinement of the topological Euler characteristic. We will review the arithmetic approach to computing the E-polynomial and discuss the calculation for certain singular character varieties (i.e. moduli spaces of flat connections). This is joint work with David Baraglia.