

Counting isogenous principally-polarized abelian varieties over finite fields

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How many principally-polarized abelian varieties over a finite field are there in a given isogeny class? I will review the result of Deligne that — in the ordinary case — allows us to translate this question into one of counting certain lattices over number rings. In the case of simple ordinary isogeny classes, we are quickly led to investigate the ring structure of a particular order in the number field defined by the characteristic polynomial of Frobenius of the isogeny class.

I will also show how estimates for the number of principally-polarized varieties in fixed isogeny classes connect to the results of Katz and Sarnak on the distribution of Frobenius eigenvalues.