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Monodromy representations and function field class numbers

Given an elliptic curve over a finite field, one might ask for the chance that it has a rational point of order ℓ . More generally, what is the chance that a curve drawn from a family over a finite field has a point of order ℓ on its Jacobian?

The answer is encoded in the ℓ -adic monodromy representation of the family in question. In this talk, I'll discuss recent work on this representation for various families of curves, and use it to prove a Cohen–Lenstra-type result for class groups of function fields.