1077-11-2088   **David Michael Zureick-Brown*** (`david.zureick.brown@gmail.com`), 628 W. College Ave., Decatur, GA 30030, and **Jordan Ellenberg** and **Bryden Cais**. *Cohen-Lenstra heuristics and Random Dieudonné Modules.*

Knowledge of the distribution of class groups is elusive – it is not even known if there are infinitely many number fields with trivial class group. Cohen and Lenstra's heuristic models the p-parts of class groups by random finite abelian p-groups, correctly predicting many strange experimental observations.

While proof of the Cohen-Lenstra conjectures remains inaccessible, the function field analogue – distribution of class groups of quadratic extensions of $\mathbb{F}_p(t)$ – is more tractable. Friedman and Washington modeled the l-power part (with $l \neq p$) of such class groups as random matrices and derived heuristics which agree with experiment. Achter later refined these heuristics, and many cases have been proved (Achter, Ellenberg and Venkatesh).

When $l = p$, the l-power torsion of abelian varieties, and thus the random matrix model, goes haywire. I will explain the correct linear algebraic model – Dieudoneé modules. Our main result is an analogue of the Cohen-Lenstra/Friedman-Washington heuristics – a theorem about the distributions of class numbers of Dieudoneé modules (and other invariants particular to $l = p$). Finally, I'll present experimental evidence supporting our heuristics and explain the connection with rational points on varieties. (Received September 21, 2011)

1