Ph.D. Thesis

Paul Pollack
(Advisor) Carl Pomerance

Prime Polynomials Over Finite Fields

Abstract

The ring of univariate polynomials over a finite field shares many foundational
arithmetic properties with the ring of rational integers. This similarity makes it possible
for many problems in elementary number theory to be translated `through the looking
glass' into the universe of polynomials. In this thesis we look at polynomial analogues of
Schinzel's Hypothesis H and other problems related to the multiplicative structure of
polynomial values. We obtain results both in the situation where the finite field $\mathbf{F}_q$ is
fixed and in the more uniform situation where $\mathbf{F}_q$ is allowed to vary. The most important
tool in these investigations is Weil's Riemann Hypothesis for global function fields,
which yields an explicit form of the Chebotarev density theorem for such fields.