

Products of distinct cyclotomic polynomials

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Thesis Abstract

A polynomial is a product of distinct cyclotomic polynomials if and only if it is a divisor over $\mathbb{Z}[x]$ of $x^n - 1$ for some positive integer n . In this thesis, we will examine two natural questions concerning the divisors of $x^n - 1$: “For a given n , how large can the coefficients of divisors of $x^n - 1$ be?” and “How often does $x^n - 1$ have a divisor of every degree between 1 and n ?” We consider the latter question when $x^n - 1$ is factored in both $\mathbb{Z}[x]$ and $\mathbb{F}_p[x]$. The primary tools used in our investigation arise from the study of the “anatomy of integers.” We also make use of results stemming from Hooley’s conditional proof of Artin’s Primitive Root Conjecture in our work over $\mathbb{F}_p[x]$.