1. *On Powers Associated with Sierpiński Numbers, Riesel Numbers and Polignac's Conjecture*, (with Michael Filaseta and Carrie Finch), submitted.

Abstract

We address conjectures of P. Erdős and conjectures of Y.-G. Chen concerning Sierpiński Numbers, Riesel Numbers and a conjecture of de Polignac. We obtain a variety of related results, including a new smallest positive integer that is simultaneously a Sierpiński number and a Riesel number and a proof that for every positive integer r, there is an integer k such that the numbers $k, k^2, k^3, \ldots, k^r$ are simultaneously Sierpiński numbers.

2. *On An Asymptotic Formula for Goldbach's Conjecture with Monic Polynomials in* $\mathbb{Z}[x]$, in preparation.

Abstract

Let $f(x)$ be a monic polynomial in $\mathbb{Z}[x]$ of degree $d > 1$. We give a proof that the number $\mathfrak{R}(y)$ of representations of $f(x)$ as a sum of two irreducible monic polynomials $g(x)$ and $h(x)$ in $\mathbb{Z}[x]$, with the coefficients of $g(x)$ and $h(x)$ bounded in absolute value by y, is asymptotic to $(2y)^{d-1}$.

3. *On Composite Numbers That Remain Composite After Any Insertion of a Digit*, (with Michael Filaseta, Charles Nicol and John Selfridge), in preparation.

Abstract

The number $N = 25011$ has the property that if you "insert" any digit $x \in \{0, \ldots, 9\}$ "into" its decimal expansion, then the new number created by this insertion is always composite. That is, every number in the set $\{x25011, 2x5011, 25x011, 250x11, 2501x1, 25011x : 0 \leq x \leq 9\}$ is composite. In fact, 25011 is the smallest, composite, natural number, coprime to 10 that exhibits this property. We prove that there are infinitely many composite, natural numbers, N, coprime to 10, with the property that if you "insert" any digit $x \in \{0, \ldots, 9\}$ "into" the decimal expansion of N, then the new number created by this insertion is always composite.