
Hyperbinary expansions and Stern polynomials

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(joint work with Karl Dilcher)

Two different types of generalized Stern polynomials $a_t(n; z)$ are obtained using recursions and generating functions. These polynomials in variable z reduce to the well-known Stern (diatomic) sequence $a(n)$ when $z = 1$. A hyperbinary expansion of an integer n is an expansion of n as a sum of powers of 2, each power being used at most twice. Integers $a(n + 1)$ in the Stern sequence count the number of hyperbinary expansions of n . In this talk, we derive the actual set of all hyperbinary expansions of n .

Properties of the Stern polynomials associated with these hyperbinary expansions are presented. The structures of certain Stern polynomials are given in terms of Jacobi polynomials. The talk concludes with an introductory analysis of the Stern polynomials being represented by continued fractions.