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Some Distributional Properties of 2-Regular Integer Sequences

The class of k-regular sequences provides an important generalization of automatic sequences and is deeply connected to many topics in number theory. We generalize a recent result of Bettin, Drappeau, and Spiegelhofer on the statistical distribution of Stern's diatomic sequence to show that a large family of 2-regular integer sequences obey a log-normal statistical distribution. Our approach relies on viewing the distribution of k-regular sequences from the perspective of products of random matrices. We discuss a connection between a specific 2-regular integer sequence and the arithmetic function $\tau(n^2+1)$.