

Prime numbers and random walks in a square grid

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One can argue that prime numbers present perplexing features, in a hybrid of local unpredictability and global regular behavior. It is this interplay between randomness and regularity that motivated searches for both local and global patterns that could potentially become signatures for certain underlying fundamental mathematical properties.

In recent years, computer simulations are playing a fundamental role in unveiling some of the most intriguing features of prime numbers. In this work, we define an algorithm for a deterministic walk through a two-dimensional grid that we refer to as Prime Walk (PW). The walk is constructed from a sequence of steps dictated by and dependent on the sequence of last digits of the primes. Despite the apparent randomness of this generating sequence, the resulting structure – both in 2d and 3d – created by the algorithm presents remarkable properties and regularities in its pattern that we proceed to analyze in detail [1].

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