

Variants of the Littlewood Conjecture and their Connection to Uniformly Distributed Sequences

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Both the **theory of uniform distribution modulo one** and **(variants of) the Littlewood conjecture** share a common origin in **Dirichlet's approximation theorem**, which states that for any real number α and any positive integer N , there exist integers p and q with $1 \leq q \leq N$ such that $|q\alpha - p| < \frac{1}{N}$ or equivalently

$$\left| \alpha - \frac{p}{q} \right| < \frac{1}{qN}.$$

Over the past 100 years—especially the last 35—researchers in both areas have (independently) studied related problems. Here, we focus on specific uniformly distributed sequences, such as Kronecker sequences and Kronecker–Halton sequences, as well as their variants over fields of formal Laurent series in positive characteristic. All of these sequences can be linked to various forms of the Littlewood conjecture. We bring together many well-known results alongside numerous open problems.