

GAP DISTRIBUTION OF \sqrt{n} MODULO 1

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ABSTRACT: It is conjectured that for all α non-integer the gap distribution of n^α modulo 1 exists. The only known case of this conjecture is for $\alpha = 1/2$, a result from 2004 due to Elkies-McMullen. Surprisingly the gap distribution in this case is not Poissonian, while it is conjectured to be Poissonian in all remaining cases. The result of Elkies-McMullen relies crucially on ergodic theory (Ratner's theorem) and Teichmüller theory. In a recent paper with Niclas Technau we have obtained a purely analytic proof of Elkies-McMullen's theorem, borrowing ideas from the circle method. I will describe our proof and its potential for obtaining other results about gaps between other sequences modulo 1 (such as $\alpha\sqrt{n}$ with α irrational, a problem left open by Elkies-McMullen).

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