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Title: Badly approximable vectors and Littlewood-type problems

Abstract:

Badly approximable vectors are fractal sets enjoying rich Diophantine properties. In this respect, they play a crucial role in many problems well beyond Number Theory and Fractal Geometry (e.g., in signal processing, in mathematical physics and in convex geometry).

After outlining some of the latest developments in this very active area of research, we will take an interest in the Littlewood conjecture (c. 1930) and in its variants which all admit a natural formulation in terms of properties satisfied by badly approximable vectors. We will then show how ideas emerging from the mathematical theory of quasicrystals and from the theory of aperiodic tilings have recently enabled us to refute the so-called t -adic Littlewood conjecture.

All necessary concepts will be defined in the talk. Some of the results are joint with Fred Lunnon (Maynooth) and Erez Nesharim (Hebrew University of Jerusalem).