University of Crete
Departments of Mathematics and Applied Mathematics

Analysis Seminar

10:00am, Wednesday, 20 November 2019
Room A-303

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The lonely runner conjecture

Suppose we have n runners with pairwise distinct constant speeds on a circular track of length 1. Is it true that every runner gets "lonely" some time, that is, the distance of every other runner is at least $1/n$? This is the content of the so-called Lonely Runner Conjecture, stated by Wills in 1968. We will present the history of this problem, as well as some recent results, for example by Terence Tao in 2017. We will also discuss the equivalence of this conjecture with several geometric problems, namely (a) lines in tori avoiding a smaller "copy" of the torus (b) lines avoiding a lattice arrangement of cubes (c) billiard ball movement in a cube (d) zonotopes avoiding a lattice. The results we obtain come from the zonotopal setting, the main tool being the Flatness Theorem of Khinchin and Banaszczyk's estimate.

This is partially joint work with Matthias Schymura.