

## Mathematical Colloquia

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**Monday, 08 April 2024**

17:15 h, lecture room B6 (ExWi)

**Dr. Gergely Kiss, Rényi Institute of Mathematics**

# Recent progress on the Discrete Pompeiu problem on the plane

**Abstract :** We study the following discrete analogue of the integral geometric problem of Dimitrie Pompeiu.

We say that a finite subset  $E$  of the Euclidean plane is Pompeiu, whenever for a given function  $f$  the values of  $f$  on any congruent copy of  $E$  is zero, then  $f$  is identically zero.

Although for sets of two or three elements the affirmative answer is easy, until recently, even for four-point sets the answer was not known.

Applying harmonic analysis in some varieties connected to the problem and also some results on linear equations of units we prove that every set having at most six elements is Pompeiu, and every finite set consisting of algebraic numbers is Pompeiu.

We also discuss the connections of this problem to some results in Euclidean Ramsey theory and the finite Steinhaus set problem posed by Stephen Jackson.