Reconstructing Finite Subsets of the Plane up to some Groups of Isometries

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(joint work with Jan Simon and Eberhard Triesch)

In this talk, we investigate geometric and combinatorial reconstruction problems, which were motivated by Kelly's and Ulam's famous Reconstruction Conjecture for graphs.

Given a group of isometries G and a finite set M of points in the Euclidean Plane, we pose the following question: Is M uniquely determined up to G-isomorphism by its k-deck - the multiset of all G-equivalence classes of subsets of cardinality k of M?

We describe an approach to tackle such geometric reconstruction problems via Fourier Analysis resp. Abstract Harmonic Analysis. Furthermore, via combinatorial arguments, we show some reconstruction results for groups which contain all translations and a small number of rotations of the plane, e.g. only rotations of 180 degree or 120 degree.

References

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