COLOQUIO JUNIOR

Martes 10 de febrero, 17:00h (coffee break a las 18:00)

Aula Naranja, ICMAT

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ICMAT

Turning a Needle: An Analyst's Perspective

A short overview of Kakeya sets and their applications

Kakeya's needle problem asks what is the smallest area in which a unit line segment can be continuously rotated inside a planar set. Despite its elementary formulation, the problem leads to highly counterintuitive constructions and plays a central role in modern analysis.

In this talk, we give a brief introduction to Kakeya and Besicovitch sets, starting from the historical development of the needle problem and Besicovitch's construction of measure-zero sets containing a unit segment in every direction. We then introduce fractal dimensions as a way to quantify the size of these sets, leading to Kakeya's conjecture and its current status.

We conclude by highlighting some applications of Kakeya-type constructions in harmonic analysis and their connections to major open problems.

ICMAT INSTITUTO DE CIENCIAS MATEMÁTICAS

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