

Calderón -Zygmund Analysis Seminar

Monday, October 19, 3:45 pm

Hausdorff dimension of unions of affine subspaces and related problems

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Abstract. We consider the question of how large a union of affine subspaces must be depending on the family of affine subspaces constituting the union. In the famous Kakeya problem one considers lines in every direction. Here the position of the lines or higher-dimensional affine subspaces is more general, and accordingly the expected dimension bound is different. We prove that the union of any s -dimensional family of k -dimensional affine subspaces is at least $k + s/(k + 1)$ -dimensional, and is exactly $k + s$ -dimensional if $s \leq 1$. We consider several closely related other problems as well.

The talk is partially based on joint work with Tamás Keleti and András Máthé.