Barcelona Analysis Seminar 2022–2023

URL. `https://mat.uab.cat/web/seminarianalisi/`

Date. March 30, 2023

Time. 15:00 CET

Room. C3b-158 (Universitat Autònoma de Barcelona)

Online streaming. Click here to join.

On the number of lower sets with fixed cardinality

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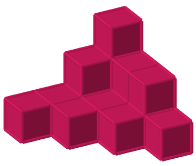
We call a set $S \subset \mathbb{Z}_+^d,\ d \geq 2$, a lower set if for any $\mathbf{x} = (x_1, ..., x_d) \in \mathbb{Z}_+^d$ the condition $\mathbf{x} \in S$ implies $\mathbf{x}' = (x_1', ..., x_d') \in S$ for all $\mathbf{x}' \in \mathbb{Z}_+^d$ with $x_i' \leq x_i,\ 1 \leq i \leq d$. One can also think of a d-dimensional lower set as of a union of unit cubes $\prod_{i=1}^d [k_i, k_i + 1],\ k_i \in \mathbb{Z}_+$, such that in each direction any cube leans either on another one or on the coordinate hyperplane. A simple example of a three-dimensional lower set can be seen in the figure below.



Lower sets are crucial objects in approximation theory, harmonic analysis, and in various problems of physics. We will discuss upper and lower bounds for the number $p_d(n)$ of d-dimensional lower sets of cardinality n. The talk does not require any prior knowledge of the topic.