DUALITY OF METRIC ENTROPY.

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If $K$ is a pre-compact subset of a normed space $X$ and $\epsilon > 0$, the quantity $\log N(K, \epsilon B_X)$ describes the complexity of $K$ at the level of resolution $\epsilon$. A 1972 conjecture of A. Pietsch – originally stated in the operator-theoretic laguage – asserts that the two “metric entropy functionals,” $\epsilon \to \log N(K, \epsilon B_X)$ and $\epsilon \to \log N(B_X^*, \epsilon K^\circ)$, are equivalent in the appropriate sense, uniformly over normed spaces $X$ and over symmetric convex sets $K$. [Here $N(S, B)$ is the covering number defined as the smallest number of translates of $B$ which covers $S$, $B_Y$ denotes the unit ball of $Y$ and $K^\circ \subset X^*$ is the polar of $K \subset X$.]

The talk will describe the progress towards solving the conjecture achieved over the last few years by the speaker and his collaborators. In particular, it is known now that the conjecture holds under rather mild geometric hypotheses (such as $K$-convexity) on the space $X$.

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