SAMPLING DISCRETIZATION OF L^p-NORMS IN FINITE DIMENSIONAL SUBSPACES

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Let L be an N-dimensional subspace of $L^p(\mu)$ with respect to some probability measure μ. In the talk we consider the following problem of sampling discretization: how many points $x_1, \dots, x_m$ are enough for the existence of the numbers c, C such that

$$c\|f\|_p^p \le \frac{1}{m}\sum_{j=1}^{m} |f(x_j)|^p \le C\|f\|_p^p$$

for every $f \in L$, where

$$\|f\|_p := \Bigl(\int |f|^p \, d\mu\Bigr)^{1/p}.$$

The obvious bound is $m \ge N$, so we want to obtain some conditions on the subspace L such that the sampling discretization problem can be solved with the number of points m close to the dimension of the subspace. We use the approach by Talagrand's generic chaining method combined with the ideas of Guédon–Rudelson and recent development of the generic chaining due to van Handel.