

MAXIMAL OPERATORS AND RESTRICTION BOUNDS FOR WEYL SUMS

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ABSTRACT: We describe several recent results on so called maximal operators on Weyl sums

$$S(u; N) = \sum_{1 \leq n \leq N} \exp(2\pi i(u_1 n + \dots + u_d n^d)),$$

where $u = (u_1, \dots, u_d) \in [0, 1)^d$. Namely, given a partition $I \cup J \subseteq \{1, \dots, d\}$, we define the map

$$(u_i)_{i \in I} \mapsto \sup_{u_j, j \in J} |S(u; N)|$$

which corresponds to the maximal operator on the Weyl sums associated with the components $u_j, j \in J$, of u . We are interested in understanding this map for almost all $(u_i)_{i \in I}$ and also in the various norms of these operators. Questions like these have several surprising applications, including outside of number theory, and are also related to restriction theorems for Weyl sums.

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