Exposé court

100 *On bounds for $B_2[g]$ sequences and the Erdős-Turán Conjecture*

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We say that $A \subset \mathbb{N}$ is an asymptotic basis of order 2 if for every sufficiently large natural number n, we have

$$n = a_1 + a_2, \qquad a_1 \leq a_2, \qquad a_1, a_2 \in A,$$

and denote by $r_A(n)$ the number of such solutions. An old conjecture of Erdős and Turán claims that there is no asymptotic basis A and no fixed $g \in \mathbb{N}$ with the property that $1 \leq r_A(n) \leq g$ for sufficiently large n. We first show after suitably weakening the preceding requirements in the conjecture that the corresponding statement does not hold. We also provide for $g \geq 2$ and some sequence $A \subset \mathbb{N}$ with the property that $r_A(m) \leq g$ new lower bounds for the counting function $|A \cap [1, x]|$.