On the Maximum of an Exponential Sum of the Möbius Function

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We obtain upper estimates on the maximum of an exponential sum of the Möbius function, that is \( \max_{\theta \in [0,1]} | \sum_{k \leq z} \mu(k) e(k\theta) | \), under various assumptions. One result is that under the generalized Riemann hypothesis, given \( \epsilon > 0 \), we have for sufficiently large \( x \), that \( \| \sum_{k \leq z} \mu(k) e(k\theta) \|_\infty \leq x^{5/6} + \epsilon \).