



# Error term improvements for van der Corput transforms

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We improve the error term in the van der Corput transform for exponential sums

$$\sum_{a \leq n \leq b} g(n) \exp(2\pi i f(n)).$$

For many functions  $g$  and  $f$ , we can extract the next term in the asymptotic, showing that previous results, such as those of Karatsuba and Korolev, are sharp. Of particular note, the methods of this paper avoid the use of the truncated Poisson formula, and thus can be applied to much longer intervals  $[a, b]$  with far better results. We provide a detailed analysis of the error term in the case  $g(x)=1$  and  $f(x)=(x/3)^{3/2}$ .

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