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Exponential Sums with Additive Coefficients

For an arithmetic function f and a real number α , consider the exponential sum

$$S_f(x, \alpha) = \sum_{n \leq x} f(n) e^{2\pi i n \alpha}.$$

The growth of these sums as x increases plays an important role in many number theory techniques. We will discuss new bounds on these exponential sums for various additive functions f , including $\omega(n)$ (the number of distinct prime factors of n) and $\Omega(n)$ (the total number of prime factors of n). We will then apply these bounds to enumerate certain integer partitions and solutions to Diophantine equations. This is joint work with Nicolas Robles.