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Major arcs and moments of general arithmetical sequences

We discuss our work with Régis de la Bretèche on the first two moments of arithmetical sequences in progressions. Instead of using the standard approximation, we generalize Vaughan's major arcs approximation to general sequences, resulting in smaller moments. In the case of the sequence of sums of divisors $\tau_k(n)$, we obtain a variance of the same order of magnitude as the probabilistic variance studied in recent work of Rodgers and Soundararajan.