Garnowski, Taylor
Asymptotic distribution of odd balanced unimodal sequences with rank congruent to a modulo c. (English) Zbl 07456310

Summary: Kim et al. (Proc Am Math Soc 144:3687-3700, 2016) introduced the notion of odd-balance unimodal sequences in 2016. Like was shown by Bryson et al. (Proc Natl Acad Sci USA 109:16063-16067, 2012) for the generating function of strongly unimodal sequences, the generating function for odd-balanced unimodal sequences also has quantum modular behavior. Odd-balanced unimodal sequences thus appear to be a fundamental piece in the world of modular forms and combinatorics, and understanding their asymptotic properties is important for understanding their place in this puzzle. In light of this, we compute an asymptotic estimate for odd balanced unimodal sequences for ranks congruent to a (mod c) for c ≠ 2 or a multiple of 4. We find the interesting result that the odd balanced unimodal sequences are asymptotically related to the overpartition function. This is in contrast to strongly unimodal sequences which, are asymptotically related to the partition function. Our proofs of the main theorems rely on the representation of the generating function in question as a mixed mock modular form.

MSC:
11-XX Number theory

Keywords:
unimodal sequences; circle method; equidistribution; mixed mock modular forms; overpartitions

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References:

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