

Rank differences modulo even integers

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F. J. Dyson conjectured that the rank of partitions provides combinatorial interpretations of S. Ramanujan's famous congruences for partition functions modulo 5 and 7. This together with all the generating functions for ranks differences modulo 5 and 7 was proved by A. O. L. Atkin and H. P. F. Swinnerton-Dyer.

In this talk, I will introduce some of my research results on rank differences modulo even integers. For example, for $0 \leq d \leq 4$, the generating functions of

$$N(0, 10, 5n + d) + N(1, 10, 5n + d) - N(4, 10, 5n + d) - N(5, 10, 5n + d)$$

and

$$N(1, 10, 5n + d) + N(2, 10, 5n + d) - N(3, 10, 5n + d) - N(4, 10, 5n + d)$$

will be given. Here $N(m, t, n)$ is the number of partitions with rank congruent m modulo t .