Research highlight:

Modular Forms and k-Colored Generalized Frobenius Partitions

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A partition of a positive integer n is a sequence of non-increasing positive integers which add up to n. The number of partitions of n is denoted by $p(n)$. Around 1984, G.E. Andrews discovered several generalizations of the usual partition of a positive integer n. He called one of these generalizations the k-colored generalized Frobenius partition of n and studied the number of such partitions of n.

The present article is about studying the properties satisfied by k-colored generalized Frobenius partition function using the theory of modular forms. Several new identities and congruences satisfied by Andrews' k-colored Frobenius partition function were discovered. In particular, we found that Ramanujan's congruences, which state that 5 divides $p(5m+4)$, 7 divides $p(7m+5)$ and 11 divides $p(11m+6)$, follow from the facts that $p(4)=5$, $p(5)=7$ and $p(6)=11$.

References:

H.H. Chan, L.Q. Wang, Y.F. Yang, Modular forms and k-colored generalized frobenius partitions. Transactions of the American Mathematical Society, 371, No. 3 (2019): 2159-2205.