Ramanujan congruences and partition with designated summands

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Abstract

A partition of a positive integer n is a nonincreasing sequence of positive integers whose sum is n. Let $p(n)$ denote the number of partitions of n. Ramanujan first discovered and proved the following three nice congruences: $p(5n + 4)$ is divisible by 5, $p(7n + 5)$ is divisible by 7, $p(11n + 6)$ is divisible by 11. From that time on, more and more people devoted to investigating the arithmetic properties of $p(n)$ and studying other types of partition functions.

In this talk, we first give a brief survey on some beautiful results for $p(n)$, and then proceed to present Ramanujan’s classical proof on the congruences modulo 5. Finally, we present our work on partition with designated summands.