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ROGERS–RAMANUJAN TYPE IDENTITIES AND THREE-LINE ARRAYS

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Abstract: In this paper, we present the combinatorial interpretations of many Rogers–Ramanujan type identities using three-line arrays. Bijections between restricted three-line arrays and restricted overpartitions are given, and as a consequence, we get fourteen combinatorial identities.

Keywords and Phrases: Rogers–Ramanujan type identities, $(n+t)$–color overpartitions, three-line arrays.

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1. Introduction

In [9], Santos et al. introduced the concept of a two-line array. For a positive integer ν, let

$$\begin{pmatrix} \alpha_1 & \alpha_2 & \dots & \alpha_r \\ \beta_1 & \beta_2 & \dots & \beta_r \end{pmatrix}, \qquad \alpha_i,\, \beta_i \geq 0 \quad \text{for } 1 \leq i \leq r \tag{1.1}$$

be a two-line array such that

$$\nu = \sum_{i=1}^{r} \alpha_i + \sum_{i=1}^{r} \beta_i. \tag{1.2}$$

Using the above two-line array representation and by imposing certain restrictions on α_i and β_i, Santos and his collaborators interpreted many identities from Slater's list [10] including Rogers–Ramanujan identities and Lebesgue's partition identities