

ON GENERALIZATIONS OF SOME COMBINATORIAL IDENTITIES

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Dedicated to Prof. M.A. Pathan on his 75th birth anniversary

Abstract: In this paper, using split $(n + t)$ -color partitions, R-weighted lattice paths and modified lattice paths, we interpret two q -series which leads to new 3-way combinatorial identities. These generalize some of the results due to Agarwal and Sachdeva.

Keywords: Split $(n + t)$ -color partitions, lattice paths, combinatorial interpretation, combinatorial identities.

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1. Introduction

A partition of an integer n is a non-increasing sequence of positive integers whose sum is n . An elementary device for studying partitions is the graphical representation. Many combinatorial objects such as lattice paths, Ferrers graphs etc are useful to represent partitions graphically. A lattice path P is a sequence $P = (a_0, a_1, a_2, \dots, a_k)$ of points a_i in \mathbb{Z}^d , $0 \leq i \leq k$. The point a_0 is the starting point and the point a_k is the terminating point of the path P . The vectors $\overrightarrow{a_0 a_1}, \overrightarrow{a_1 a_2}, \dots, \overrightarrow{a_{k-1} a_k}$ are called the steps of the path P . Throughout this paper, we consider the paths in the plane integer lattice \mathbb{Z}^2 .