

**FAMILY OF CONGRUENCES FOR $(2, \beta)$ -REGULAR
BIPARTITION TRIPLES**

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Abstract: Though congruences have their limitations, they have significant importance in the field of number theory and helps in proving many interesting results. Thus, this article has adopted the technique and properties of congruences to identify and prove a set of congruent properties for integer partition. The partition of a positive integer is a way of expressing the number as a sum of positive integers. One such partitions known as regular bipartition triple are discussed in this article. New congruences modulo even integers and modulo prime ($p \geq 5$) powers are derived for $(2, \beta)$ -regular bipartition triples. Also infinite families of congruences modulo 2 for some $(2, \beta)$ -regular bipartition triples are derived. The theorems stated in this article are proved using the q -series notation and some of the prominent results such as Euler's pentagonal number theorem and Jacobi's triple product identities. There are certain lemmas which are derived using these results that help in proving the major results of this article.

Keywords and Phrases: Integer partitions, Bipartition Triples, Congruences, q -series.

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1. Introduction

A partition α of an integer $n > 0$ is a non - increasing sequence of positive integers $\alpha_1, \alpha_2, \alpha_3, \dots, \alpha_k$ such that, $n = \alpha_1 + \alpha_2 + \alpha_3 + \dots + \alpha_k$. $p(n)$ represents