

# HIGHER-ORDER DIFFERENCES AND HIGHER-ORDER PARTIAL SUMS OF EULER'S PARTITION FUNCTION \*

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Dedicated to Professor Mihail Megan  
on the occasion of his 70th anniversary

## Abstract

We provide generalizations for Euler's recurrence relation for the partition function  $p(n)$  and the recurrence relation for the partial sums of the partition function  $p(n)$ . As a corollary, we derive an infinite family of inequalities for the partition function  $p(n)$ . We present few infinite families of determinant formulas for: the partition function  $p(n)$ , the finite differences of the partition function  $p(n)$  and the higher-order partial sums of the partition function  $p(n)$ .

MSC: 05A19, 05A20

**keywords:** partitions, finite differences, partial sums

## 1 Introduction

Let  $n$  be a positive integer. In order to indicate that  $\lambda = [\lambda_1, \lambda_2, \dots, \lambda_k]$  is a partition of  $n$ , i.e.,

$$n = \lambda_1 + \lambda_2 + \dots + \lambda_k,$$

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