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**CONNECTION BETWEEN PARTIAL BELL POLYNOMIALS AND  
 $(q; q)_k$ ; PARTITION FUNCTION, AND CERTAIN  
 $q$ -HYPERGEOMETRIC SERIES**

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**Abstract:** We exhibit a relationship between  $q$ -shifted factorial,  $(q; q)_n$ , and the incomplete exponential Bell polynomials and also evaluate several  $q$ -hypergeometric series using the  $q$ -version of Petkovsek-Wilf-Zeilberger's algorithm. Finally, we write the partition function  $p(n)$  in terms of  $Q_m(k)$ , the number of partitions of  $m$  using (possibly repeated) parts that do not exceed  $k$ .

**Keywords and Phrases:** Partial Bell polynomials,  $q$ -analysis, Hessenberg determinant,  $q$ -Hypergeometric series,  $q$ -Petkovsek-Wilf-Zeilberger's techniques, Partition functions.

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