

## On Power Series, Bell Polynomials, Hardy-Ramanujan-Rademacher Problem and Its Statistical Applications

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*Abstract:* A possibly unknown approach to the problem of finding the common term of a power series is considered. A direct formula for evaluating this common term has been obtained. This formula provides useful expressions for direct evaluation of the number of partitions of a nonnegative integer and the partitions themselves. These expressions permit easily to work with power series, evaluate  $n$ -th derivative of a composite function, calculate Bernoulli, Euler, Bell and other numbers, evaluate Bell polynomials, cycle index etc. Alternative expressions and some other new results for the truncated Bell polynomials have also been obtained. Some statistical applications of results under consideration and features of generalized probability generating functions are discussed.

*Keywords:*

*AMS Subject Classification:*