IMPROVED BOUNDS ON BELL NUMBERS AND ON MOMENTS OF SUMS OF RANDOM VARIABLES

Daniel Berend
Tamir Tassa

Abstract: We provide bounds for moments of sums of sequences of independent random variables. Concentrating on uniformly bounded non-negative random variables, we are able to improve upon previous results due to Johnson et al. [10] and Latała [12]. Our basic results provide bounds involving Stirling numbers of the second kind and Bell numbers. By deriving novel effective bounds on Bell numbers and the related Bell function, we are able to translate our moment bounds to explicit ones, which are tighter than previous bounds. The study was motivated by a problem in operation research, in which it was required to estimate the L_p-moments of sums of uniformly bounded non-negative random variables (representing the processing times of jobs that were assigned to some machine) in terms of the expectation of their sum.

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