

ON A RELATIONSHIP BETWEEN USPENSKY'S THEOREM AND POISSON APPROXIMATIONS

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Abstract. In this paper we show that Uspensky's expansion theorem for the Poisson approximation of the distribution of sums of independent Bernoulli random variables can be rewritten in terms of the Poisson convolution semigroup. This gives rise to exact evaluations and simple remainder term estimations for the deviations of the distributions in study with respect to various probability metrics, generalizing results of Shorgin (1977, *Theory Probab. Appl.*, **22**, 846–850). Finally, we compare the sharpness of Poisson versus normal approximations.

Key words and phrases: Poisson approximation, Uspensky's theorem, operator semigroups, probability metrics.