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Data for a statistical analysis are always given in a rounded form, so they contain both a random error and a rounding error. The rounding errors are especially serious and must not be ignored when the sample size is large. These days, huge data sets become more and more usual due to the rapid development of the computer technologies, therefore there is a growing interest to statistical analysis of rounded data, see, for example, [1–4] and references therein.

Rounding can arise as a result of limited sensitivity of measuring equipment or can be artificial, in the form of binning, for example, when the number of observations is so large that either registration or realization of the statistical procedure for they directly is difficult.

Suppose that the data are independent and identically distributed random variables given in a discretized form. And suppose that the expectation is estimated by averaging the data. It was shown in [5] that it is possible to achieve accuracy essentially better than the discretization step if a certain additional error is added to the data before registration. In that paper, a limit case was considered (as the sample size tends to infinity). In this work, we study the finite sample case. It is shown that if the error is normally $\mathcal{N}(0, \sigma^2)$ distributed, then the α-optimal standard deviation of the additional error (the deviation minimizing the length of the $(1-\alpha)$-confidence interval for the expectation) is the solution of the equation

$$\sigma\, e^{-2\pi^2\sigma^2} = \frac{z_{\alpha/2}}{4\pi\sqrt{n}}.$$

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