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A significant amount of the human knowledge of Nature is based on the evidence which the rigorous mathematics would have called insufficient. However, in some cases (very important ones indeed) the increasing of data statistics is hardly implementable, added to which once such problem has been overcome in one field of the research investigations there appear another ones with the same problem. Radioactivity is a very proliferic source of the information about the atomic and subatomic world, but in some cases it is just an example of the above situation, e.g., experiments on the synthesis of superheavy elements, the outcome of which is always small. The report discusses the different aspects of the data analysis under unfavorable conditions : low statistics, incomplete observation data etc. and their impact on the the parameter estimation and the hypothesis testing which in case of the exponential distribution are very unfavorable to the low statistics, since here its most probable event is very far from the expected one.

A special attention is given to criteria for an optimum test by its different merits: minimal confidence interval length, maximum covering probability, the most "natural" interpretation, etc.

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