

Expectation ranges from over-rounded and censored data

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In CMC statistics, expectation ranges of the form mean plus/minus a multiple of the standard deviation are used for various purposes, e.g., in control charts, to define out-of-expectation limits, or in comparative analytical assessments. Sometimes one is facing the situation that the reported data is “over-rounded” such that the data at hand is rather discrete even though the underlying measured values are from a continuous scale. In addition, some measurements might be very small and reported as below the limit of quantification. In such cases the usual way of computing mean and standard deviation is not meaningful or even impossible. All one can actually conclude from the reported data is that the measured values lie within certain intervals. In this presentation, several approaches how to compute expectation ranges from interval data will be presented. Among them, there are maximum likelihood approaches and an interval analysis approach. A simulation study is performed to compare the different methods and to discuss their pros and cons.