

## INEQUALITIES FOR QUANTILES OF THE CHI-SQUARE DISTRIBUTION

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*Abstract:* We obtain a new sharp lower estimate for tails of the central chi-square distribution. Using it we prove quite accurate lower bounds for the chi-square quantiles covering the case of increasing number of degrees of freedom and simultaneously tending to zero tail probabilities. In the case of small tail probabilities we also provide upper bounds for these quantiles which are close enough to the lower ones. As a byproduct we propose a simple approximation formula which is easy to calculate for the chi-square quantiles. It is expressed explicitly in terms of tail probabilities and a number of degrees of freedom.

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