N. Balakrishnan · **T. Li**

Confidence intervals for quantiles and tolerance intervals based on ordered ranked set samples

Abstract Confidence intervals for quantiles and tolerance intervals based on ordered ranked set samples (ORSS) are discussed in this paper. For this purpose, we first derive the cdf of ORSS and the joint pdf of any two ORSS. In addition, we obtain the pdf and cdf of the difference of two ORSS, viz. $X_{s:N}^{\mathrm{ORSS}} - X_{r:N}^{\mathrm{ORSS}}$, $1 \leq r < s \leq N$. Then, confidence intervals for quantiles based on ORSS are derived and their properties are discussed. We compare with approximate confidence intervals for quantiles given by Chen (*Journal of Statistical Planning and Inference*, **83**, 125–135; 2000), and show that these approximate confidence intervals are not very accurate. However, when the number of cycles in the RSS increases, these approximate confidence intervals become accurate even for small sample sizes. We also compare with intervals based on usual order statistics and find that the confidence interval based on ORSS becomes considerably narrower than the one based on usual order statistics when n becomes large. By using the cdf of $X_{s:N}^{\mathrm{ORSS}} - X_{r:N}^{\mathrm{ORSS}}$, we then obtain tolerance intervals, discuss their properties, and present some tables for two-sided tolerance intervals.