CONSERVATISM OF THE z CONFIDENCE INTERVAL UNDER SYMMETRIC AND ASYMMETRIC DEPARTURES FROM NORMALITY

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Abstract. The robustness of the z-interval under nonnormality is investigated by finding its infimum coverage probability over suitably chosen broad class of distributions. In the case of $n = 1$, the infimum coverage probabilities over the normal scale mixture and the symmetric unimodal families of distributions are obtained analytically. For general n, the infimum problem is theoretically reduced to a finite dimensional minimization which is then obtained numerically. The obtained minimum coverage probabilities are very close to the nominal probabilities. These exact minimum coverage probabilities are often notably sharper than the lower bounds given by the Camp-Meidell-Gauss inequality. The family of general unimodal distributions is considered next to investigate the possible effect of asymmetry. The obtained infimum coverage probabilities over this family are found to be the same as the ones over the symmetric unimodal class.

Key words and phrases: Camp-Meidell inequality, coverage probability, normal scale mixture, robustness, unimodal, z-interval.