ABSTRACT

Making predictions of future realized values of random variables based on currently available data is a frequent task in statistical applications. In some applications, the interest is to obtain a two-sided simultaneous prediction interval (SPI) to contain at least k out of m future observations with a certain confidence level based on n previous observations from the same distribution. A closely related problem is to obtain a one-sided upper (or lower) simultaneous prediction bound (SPB) to exceed (or be exceeded) by at least k out of m future observations. In this paper, we provide a general approach for constructing SPIs and SPBs based on data from a member of the (log)-location-scale family of distributions with complete or right censored data. The proposed simulation-based procedure can provide exact coverage probability for complete and Type II censored data. For Type I censored data, the simulation results show that our procedure provides satisfactory results in small samples. We use three applications to illustrate the proposed simultaneous prediction intervals and bounds.