Analysis of rounded data from dependent sequences

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Abstract   Observations on continuous populations are often rounded when recorded due to the precision of the recording mechanism. However, classical statistical approaches have ignored the effect caused by the rounding errors. When the observations are independent and identically distributed, the exact maximum likelihood estimation (MLE) can be employed. However, if rounded data are from a dependent structure, the MLE of the parameters is difficult to calculate since the integral involved in the likelihood equation is intractable. This paper presents and examines a new approach to the parameter estimation, named as "short, overlapping series" (SOS), to deal with the α-mixing models in presence of rounding errors. We will establish the asymptotic properties of the SOS estimators when the innovations are normally distributed. Comparisons of this new approach with other existing techniques in the literature are also made by simulation with samples of moderate sizes.

Keywords   ARMA(p, q) model · BRB corrections · Rounded data · Sheppard corrections · SOS estimation