MISSING DATA AND IMPUTATION IN PERIODICALLY CORRELATED HEAVY TAILED PROCESSES

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We consider periodically correlated or cyclostationary processes with data that is missing at random and errors that belong to a class of heavy tailed distributions. The processes we model are mean zero and periodic in the variance structure. In particular we model these processes as a K-dependent process \( \{X(t)\} \) with a multivariate t-distribution and the covariance matrix \( \Sigma \) of order \( 2(K-1) \times 2(K-1) \). Moreover, we assume that the number of degrees of freedom \( \nu \) is fixed and \( 2 < \nu \leq 6 \). We use the periodic sequence \( \{c(t)\} \) with the period H as the periodic amplitude imposed over the stationary background process \( \{X(t)\} \). We propose four imputation algorithms for the missing data based on properties of the multivariate t-distribution. The performance of the imputation algorithms is compared using simulations. Periodic phenomena are observed in modeling climate data and electrical signals in muscles during movement among others.

**Keywords:** Cyclostationary process, missing data, heavy tailed errors