On Nonparametric Estimation of Time Series with Missing Data.

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This work deals with nonparametric estimation of the covariance function of a stationary process generating a time series with missing data. Such a time series is considered as a realization of an amplitude-modulated process as in the Parzen's precursor paper (1963, Sankhya, Ser.A, 25). We study the covariance estimator proposed therein under very general conditions, including nonlinearity, to be assumed by the observation process. We require only weak assumptions, including asymptotic stationarity, about the missing data pattern whether it is deterministic or random. We derive asymptotic covariances of this estimator and obtain generalizations of the well-known Bartlett covariance formula in the complete case. The difference between the variances obtained in the full and missing data cases is quantified. This last exhibits the negative impact of the missing data on the estimation, as expected. An application to an Algerian monthly rainfall series is discussed.

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