Comparison of the autoregressive and autocovariance prediction results on different stationary time series

Wieslaw Kosek

Agriculture University of Krakow, Environmental Engineering and Land Surveying Department, Krakow, Poland

The advantages and disadvantages of the autoregressive and autocovariance prediction methods are presented using different model time series similar to the observed geophysical ones, e.g. Earth orientation parameters or sea level anomalies data. In the autocovariance prediction method the first predicted value is determined by the principle that the autocovariances estimated from the extended by the first prediction value series coincide as closely as possible with the autocovariances estimated from the given series. In the autoregressive prediction method the autoregressive model is used to estimate the first prediction value which depends on the autoregressive order and coefficients computed from the autocovariance estimate. In both methods the autocovariance estimations of time series must be computed, thus application of them makes sense when these series are stationary. However, the autoregressive prediction is more suitable for less noisy data and can be applied to short time span series. The autocovariance prediction is recommended for longer time series and but unlike autoregressive method can be applied to more noisy data. The autoregressive method can be applied for time series having close frequency oscillations while the autocovariance prediction is not suitable for such data. In case of the autocovariance prediction the problem of estimation of the appropriate forecast amplitude is also discussed.