Robust Forecasting with Exponential and Holt-Winters Smoothing

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Robust versions of the exponential and Holt-Winters smoothing method for forecasting are presented. They are suitable for forecasting univariate time series in presence of outliers. The robust exponential and Holt-Winters smoothing methods are presented as a recursive updating scheme. Both the update equation and the selection of the smoothing parameters are robustified. This robust method is equivalent to a particular form of the robust Kalman filter in a local linear trend model. A simulation study compares the robust and classical forecasts. The presented method is found to have good forecast performance for time series with and without outliers, as well as for fat tailed time series. The method is illustrated using real data incorporating trends and seasonal effects.