

Topics of the lab: Fitting Holt-Winters and non-seasonal ARIMA models to time series data

The aim of the lab is to prepare for the test.

Based on we have learnt so far we can

- Fit and check suitability of exponential smoothing, Holt's and ARIMA models to non-seasonal data
- Fit and check suitability of Holt-Winters models for seasonal data
- Compare different models based on several performance measures

The decision about suitability is made based on randomness of the residuals (one step prediction errors), which we check by looking at autocorrelations (acf plots) and groups of autocorrelations (Ljung-Box test).

Exercises of the lab:

For each time series from sample datasets (available from Moodle)

1. find the best model from Holt-Winter's models and non-seasonal ARIMA models (and explain, why you consider it to be the best). Also comment about the suitability of the model (with enough detail so that by reading it is possible to understand, what your decision is based on).
2. In the case of ARIMA models, write down the equation of the best model in the form $Z_t = \dots$, without using any shift operators). In the case of HW models write down the parameters α, β, γ and also the type of the model (additive or multiplicative).
3. In all cases (even when the best model is not suitable for predictions) write down the predictions for the next 2 time moments.