732A62 Time Series Analysis
Division of Statistics and Machine Learning
Department of Computer and Information Science

Teaching session II

Instructions

The hand-in assignment should be solved individually and should be submitted via LISAM in pdf format before the deadline also specified in LISAM. For the best learning outcome, you are encouraged to solve the problem by pen and paper and take a photo in pdf format and submit. However, non-hand-written solutions are equally accepted by the teacher.
The solutions are graded pass / insufficient. An insufficient solution can be completed and resubmitted.

1. Hand in assignment

Assignment 1

Using the example solved during lecture 6 find the state space representation for a multiplicative seasonal ARIMA model ARIMA$(p,d,q)\times(P,D,Q)_s$. This process can be written as in the following using the backshift operator.

$$\Phi^{\boldsymbol{P}}(\boldsymbol{B}^{\boldsymbol{s}})\phi^{\boldsymbol{p}}(\boldsymbol{B})(\mathbf{1}-\boldsymbol{B}^{\boldsymbol{s}})^{\boldsymbol{D}}(\mathbf{1}-\boldsymbol{B})^{\boldsymbol{d}}\boldsymbol{x}_{\boldsymbol{t}}=\Theta^{\boldsymbol{Q}}(\boldsymbol{B}^{\boldsymbol{s}})\theta^{\boldsymbol{q}}(\boldsymbol{B})\boldsymbol{w}_{\boldsymbol{t}}$$

If the parametric representation imposes prohibitive barriers for you to solve the problem, you may use the following parameters:

$$p=3,\qquad d=2,\qquad q=1,\qquad P=2,\qquad D=1,\qquad Q=1,\qquad s=5.$$