

Help je medestudenten of je opvolgers een handje vooruit met het reconstrueren van je examens! Ekowiki en de studenten zullen je dankbaar zijn!

1^e MASTER OF BUSINESS AND INFORMATION SYSTEMS ENGINEERING

Advanced Time Series Analysis

Written – 3 hours January 2021

4 open questions and 10 MCQ

Question 1

SARIMA models

- A) Give the equation of a SARMA(0,2)(0,1) for a TS with monthly seasonality ($s = 12$)
- B) Make a sketch of the corresponding correlogram
- C) Explain how you would expect the mean monthly values to look like on the monthplot

Question 2

Forecasting : Given $\Delta Y_t = U_t - \theta U_{t-1}$

- A) Compute an operational forecast at horizon $h = 2$
- B) Compute the variance of the forecast error at $h = 2$
- C) How can the value obtained in (B) be useful in the context of forecasting?

Question 3

Conditional heteroskedasticity : Given $Y_t = U_t \sigma_t$

With U_t a white noise with mean 0 and variance 1 and

$$\sigma_t^2 = \omega + \gamma Y_t^2$$

- A) Compute the unconditional variance
- B) Prove that the kurtosis of Y is larger than 3

Question 4

VAR models : Given two stationary TS X and Y

- A) What is the equation of a VAR(2)?
- B) How can you test if Y Granger causes X ?
- C) How can you automatically decide the order of a VAR model?

Question 5

10 MCQ :

- A) Diebold Mariano test : interpret R output
- B) Ljung-Box test : interpret R output
- C) ADF trend test : interpret R output
- D) What is the test equation of the ADF test?
- E) Which equation models correctly a piece-wise linear model with a kink at time $T = 6$?
- F) Which value is minimized by the squared loss function?
- G) Two ARMA models with the same in-sample MSE. Which affirmation is always true regarding the two models?
- H) An AR(p) model without a constant term. What is the infinite horizon prediction?
- I) Out-sample criteria with $S = \dots$ and $H = \dots$. How many times do we need to recompute the model?
- J) Analyze two graphs representing impulse response functions.