Advanced Time Series Analysis
21. January 2025

1) MA(1) process given

a. Calculate forecast horizon of h=1 and h=2

b. Make it operational

c. Calculate forecast error for h=2, calculate mean and variance of this error

d. Give the prediction intervall (95%) and state were you used the normality assumption

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2) Garch model given

a. Calculate the conditional mean and variance

b. Calculate the mean and variance

c. Calculate the correlation of lag = 1

d. Proof that the kurtosis is larger than three

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3) Var(1) model given

a. What is the order and the dimension of the model?

b. Give H_0 for no granger causality of Y_t on X_t

c. Given that the model is validated, draw a cross-correlogram of the residuals of the model.

d. What is the impulse-response function of X_t, if u_{yt} is increased by one for lag = 0, 1, 2.

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4) Dickey-fuller, AR(1)/ random walk TS given

a. State the test equation and H_0 for dickey fuller

b. Why do we need the DF distribution and not normality/t-distribution?

c. What is the advantage of the augmented dickey-fuller test and how is the test-equation? Motivate.

d. Explain the engle-granger test, the test-equation and H_0.

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5) Multiple-choice, (no guess correction)

a. Calculate the parameters of a VAR

b. Rolling window with h, s, t given, how many samples Answer: (T-S-H+1)

c. Distributes Lag model given, we increase X_t by one, what is the long-run effect?

d. In-sample/out sample MSE, where are complexe models advantages by MSE?

e. lineare regression with kink at 60

f. f-test of the linear regression is significant, what does that mean?

f. MAPE is defined how?

g. VECM(1), 4 dim, how many single gamma parameter exist?

h. Ljung-test output

P.S.: Hopefully, your sleeves slip down while you're washing your hands. I am an exchange student. At my home university, we have plenty of protocols, sometimes going back 10-15 years in the past. Here? Almost none.