

Continuous Assessment Homework 1 - 2024

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Answer the following questions using all your knowledge and the software R. Send me the answer in a pdf no later than June 3, Monday. Be creative.

1. Read the file *ldeaths* in the folder datasets of R. Make the graphical representation. Identify and estimate the trend, the seasonal component and the residual component. Are the residuals a sample of an IID noise?
2. Simulate a Gaussian white noise of $n = 10.000$ data. Verify by testing that it is an IID noise and a Gaussian white noise. Simulate a Gaussian Random Walk. Simulate IID noises of 10.000 data that are not a Gaussian white noise: a Poisson noise and an exponential noise. Test all what you can.
3. Simulate an AR(p) model with 10000 data, for $p=1$ and $p=2$. Fit the best model to the data in both cases. Validate the model by showing the residuals are an IID noise.
4. Simulate an ARMA (2,1). Compute the autocorrelation and the partial autocorrelation. Fit the best ARMA model. Validate it. Make the graphical representation of the forecasting.
5. Take the file *Nile* in datasets. Fit the best ARIMA model to the process. Validate it. Make the graphical representation of the forecasting.
6. Simulate a FARIMA time series. Fit it the best model and test that the residuals of the fitted model are a white noise. Fit a FARIMA model to Nile data in datasets. Check that the fitted model is a good model.

7. Simulate a GARCH(1,1) time series. Fit the best model to this series. Check that the fitted model is a good model. Fit a GARCH model to the logarithmic transformation of series in EuStockMarkets of datasets. Check the stylized facts (un-correlation, correlation of the squares, heavy tails, volatility clustering). Check that the fitted model is a good model.