

Seminar 8 Solutions

Giulio Rossetti*

giuliorossetti94.github.io

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* email: giulio.rossetti.1@wbs.ac.uk

Disclaimer

Full solutions are available on my.wbs. All exercises are examinable material, not just the ones we covered in the seminars.

Roadmap

Question 1: Forecasting with ARIMA(1,2)

Write down a set of equations to produce one-step, two-step, and three-step ahead forecasts for y_t , given that it follows an ARIMA(1,2) process:

$$y_t = \phi y_{t-1} + \varepsilon_t + \theta_1 \varepsilon_{t-1} + \theta_2 \varepsilon_{t-2}, \quad \varepsilon_t \sim N(0, \sigma_t^2).$$

Roadmap

Question 2: Pseudo Out-of-Sample Forecasting

Outline the stages of a **pseudo out-of-sample** forecasting evaluation, comparing a "benchmark" AR(1) with the ARIMA(1,2) model.

Hints:

- (i) Recursive/repeated estimation with an expanding sample.
- (ii) Choice of h -steps forecasting at each point.
- (iii) Forecast error comparison via root mean square forecast error (RMSE) and statistical testing.

Roadmap

Question 3: Forecast Uncertainty in MA(2)

would you evaluate forecast uncertainty of 1-step and 2-step ahead forecasts?

Assume the forecasts come from an MA(2) process.

Hint: Consider the variances of the forecasts at each step.