University of Duisburg-Essen
Faculty of Business Administration and Economics
Chair of Econometrics

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Multivariate Time Series Analysis

Solution Exercise Sheet 3

1 Exercise 1: VAR(1) Moments and Stationarity

Take the VAR(1) model $z_t = \phi_0 + \phi_1 z_{t-1} + a_t$ with the following parameterisation:

$$\phi_0 = \begin{pmatrix} 1 \\ 0 \end{pmatrix}, \quad \phi_1 = \begin{pmatrix} 0.75 & 0 \\ -0.25 & 0.5 \end{pmatrix}, \quad \Sigma_a = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$$

a) Compute the mean of the process.

b) Show that the process is stationary.

c) Derive the Yule-Walker equations for the lage $l = \{0, 1, 2\}$ and show that the solution for Γ_0 coincides with equation (2.3) on slide 2-15.

d) Compute Γ_0 and Γ_1 by hand based on your results from c).