Advanced Econometrics
Sogang University

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Matlab exercises

Due: Nov. 7, 2017
Note: 1. Work alone! 2. Submit solutions of the home assignment to the TA. (Submit both the program and output files.) Both hard- and e-copies are allowed.

1. Calculate $\sum_{i=1}^{100} \frac{1}{i^2}$ and put the computation result in a separate file.

2. Write a Matlab function that calculates R^2, AIC and BIC. Report their values for the data Data_Matlab.xlsx.

3. Consider the AR(1) model

$$\begin{aligned} y_t &= \alpha y_{t-1} + u_t, \ (t = 2, ..., 100)\,; \\ y_0 &= 0; \\ u_t &\sim iid\ N(0, 1). \end{aligned}$$

The t-ratio for the null hypothesis $H_0 : \alpha = 1$ is formulated as

$$\tau = \frac{\hat{\alpha} - 1}{\sqrt{\hat{\sigma}^2 \left(\sum_{t=2}^{100} y_{t-1}^2 \right)^{-1}}},$$

where $\hat{\alpha}$ is the OLS estimator of α and $\hat{\sigma}^2 = \sum_{t=2}^{100} (y_t - \hat{\alpha} y_{t-1})^2 / 99$. Find the 5% and 95% percentiles of the t-ratio using simulation with iteration number 100,000.