Midterm Exam 1 — 7 questions. All sub-questions carry equal weight.

1. (20%) Consider the AR model

$$y_t = 37 + 0.8y_{t-1} + u_t \, ,$$

where u_t is iid.
a) Is this model stable?

Now assume that you have the model

$$y_t = 13 + u_t + 0.2u_{t-1} + .4u_{t-2} \, .$$

b) Calculate the variance of y_t and all auto-covariances.

c) Consider the model in a). If $y_0 = 10$, what is $E_0 y_1$? What is $E_0 y_2$?

d) Consider the model in b). If $u_0 = 10$, $u_{-1} = 0$, and $u_{-2} = 10$, what what is $E_0 y_1$? What is $E_0 y_2$?

2. (20%) Assume that Hall's PIH-model holds. Assume that the rate of interest is 10% and that

$$y_t = 50 + 0.8y_{t-1} + u_t + 0.5u_{t-1} \, ,$$

where u_t is iid. Calculate (giving the correct formula) the change in consumption in year t in response to a 100$ innovation u_t.

3. (15%) For Hall's PIH-model explain briefly:
a) What is meant by Excess Smoothness of Consumption?
b) What is meant by Excess Smoothness of Consumption?
c) Suggest a way to test for Excess Sensitivity of Consumption.

4. (10%). Derive the Euler-equation for an asset with a random rate of return using the "permutation method" of the hand-out.

5. (8%) Explain what is meant by the Lucas supply curve? (Don't derive it).

6. (20%) Explain in details the logic of Lucas' imperfect information model. (You don't have to derive the equations, or even write down equations, but if you use words you need to make sure that you are precise.)

7. (7%) Derive the aggregate demand (AD) curve taking the IS/LM and its underlying assumptions as given.