MACROECONOMICS 2017

Problem set n° 2

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1) Consider the OLG with money seen in class, where the two periods endowments of the consumption good for the representative agent are $e_1 > 0$ and $e_2 > 0$, with the population growing according to the following equation $N_t = (1+n)^t N_0$

   Suppose the good is perishable, that is the storage technology is characterized by a return rate $r = -1$.

   a) Write down the budget constraints, for the two periods, and the inter-temporal budget constraint.

   b) Discuss the dynamic stability of monetary stationary state, that is the stability of the real-money market equilibrium equation $m_{t+1} = h(m_t)$, when the utility function of the representative agent $W(c_{1t}, c_{2t+1})$ is

      i) $c_{1t} + \frac{log c_{2t+1}}{1+\theta}$ ii) $c_{1t} + \frac{c_{2t}}{1+\theta}$

2) Consider the OLG without money seen in class, where the two periods endowments of the consumption good for the representative agent are $e_1 = 0$ and $e_2 = 0$. Population grows as in problem 1. Suppose the utility function of the representative agent $W(c_{1t}, c_{2t+1}) = log c_{1t} + \frac{c_{2t+1}}{1+\theta}$ and the production function $f(k_t) = k_t^a$, with $0 < a < 1$. Find the dynamic law driving the evolution of the equilibrium per capita capital k_t, discuss its stationary states and its dynamics

3)

   A) Consider the following one variable $x_t \geq 0$, discrete time, dynamical system

$$x_t = a x_{t-1}(b - x_{t-1}) + c(b - x_{t-1}) \ (Generalised\ logistic\ \ function) \ \ with\ a, b, c > 0$$

   Draw a graph of the function, find the Stationary States and discuss their stability. Can the system ever exhibit cyclical dynamics?

4) Consider the two variable, first order linear difference equation, system

$$x_t = 2x_{t-1} + y_{t-1} + 5$$
$$y_t = 0.3 y_{t-1} + 1$$

Find the stationary state of the system and discuss whether or not is a saddle point.