

Instructions:

- Please, read carefully each point before answering. Make sure you understand!
- One PS per team
- Intuition, intuition, intuition! (be concise, yet do not forget the intuition)
- Why not in L^AT_EX? ☺

Question1 (20 points)

Let's assume that a simple production function in Solow-Model could be written as $Y = AK^\alpha L^\beta$.

- Is it a well-behave function?
- How does the steady state look like under this functional form? (make a graph?).
- What are the values of the main variables at the steady state? (k^*, c^*)
- What is the growth rate of capital around k^* . Can I have a closed solution?

Question2 (25 points)

Consider the production function $Y = AK + BL$ where A and B are positive constants:

- Is this production function neoclassical? Which of the neoclassical conditions does it satisfy and which ones does it not?
- Write the output per person as a function of capital per person. What is the marginal product of $k = \frac{K}{L}$? What is the average product of k ?

Now let's assume that population grows at the constant rate n and that capital depreciates at the constant rate δ .

- Write down the fundamental equation of the Solow-Swan model.
- Under which conditions does this model have a steady state with no growth of per capita capital?
- If $s = 0.4$, $A = 1$, $B = 2$, $\delta = 0.08$ and $n = 0.02$, what is the long-run growth rate of this economy? what if $B=5$? Explain the difference.

Question3 (20 points)

Let us consider that a economy follows this production function:

$$Y = AK^\lambda H^\eta [T(t)L]^{1-\alpha-\eta}$$

- Is this production function neoclassical?
- What the growth rate of the physical capita?
- what is the main steady-state condition?

Question4 (20 points)

Let us consider the standard Solow model introducing technology:

$$Y = F(K, AL) = K^\alpha (AL)^{1-\alpha}$$

Where A is a technology variable.

- Why this model differs from the Solow-Swan Model? Do we need any extra assumption on how A is growing?
- Solve the steady state (make a graph)
- Draw the solow diagram with technological progress

Question5 (10 points)

Suppose the U.S. Congress enacts legislation that discourages saving and investment, such as the elimination of the investment tax credit that occurred in 1990. As a result, suppose the investment rate falls permanently from s' to s'' . (i.e. $s' > s''$). Examine this policy change in the Solow model with technological progress, assuming that the economy begins in steady state. Sketch a graph of how (the natural log of) output per worker evolves over time with and without the policy change. Make a similar graph for the growth rate of output per worker. Does the policy change permanently reduce the level or the growth rate of output per worker?