

Macroeconomics II

Leopold von Thadden
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Problem Set 1:
Golden rule

Problem 1: Cobb Douglas production function and the golden rule solution

Assume the production function $Y_t = F(K_t, N)$ is given by

$$Y_t = K_t^\alpha N^{1-\alpha}, \quad \text{where } \alpha \in (0, 1).$$

- a) Verify that this production function has constant returns to scale.
- b) Verify that this production function satisfies the Inada conditions.
- c) Calculate the golden rule value of the capital stock in per capita terms, i.e. k_{GR} .
- d) Verify the comparative statics results with respect to δ derived in the Lecture Notes, i.e.

i)

$$\frac{dk_{GR}}{d\delta} = \frac{1}{f''(k_{GR})}$$

ii)

$$\frac{dc_{GR}}{d\delta} = -k_{GR} < 0.$$