Advanced Macroeconomics

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)

   $$\frac{dk_{GR}}{d\delta} = \frac{1}{f''(k_{GR})} < 0$$

   ii)

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