

TD – Wednesday, October 17, 2018

Producer Theory

The following exercises must be submitted on Wednesday, October 17. A particular attention will be given to your presentation.

Exercise 1. $L = 2$ is the number of commodities. The firm produces commodity 2 using commodity 1 as an input.

1. The production function is $f(z) = \alpha(1 - \exp(-kz))$ with $k > 0$, $\alpha > 0$ and $z \geq 0$.
 - Determine and draw the production set Y determined by the production function f .
 - For every level of output $\bar{y}_2 \geq 0$, determine and draw the following set

$$Y(\bar{y}_2) := \{z \in \mathbb{R} : z \geq 0 \text{ and } f(z) \geq \bar{y}_2\}$$

- Write the cost minimization problem of this firm.
 - Determine the demand of inputs and the cost function of the firm.
2. The production function is $f(z) = \alpha\sqrt{z}$ with $\alpha > 0$ and $z \geq 0$, same questions.
 3. The production function is $f(z) = \alpha z^2 + \beta z$ with $\alpha > 0$, $\beta > 0$ and $z \geq 0$, same questions.

Exercise 2. $L = 3$ is the number of commodities. The firm produces commodity 3 using commodities 1 and 2 as inputs. The production function is given by

$$f(z_1, z_2) = (z_1)^\alpha (z_2)^\beta \text{ with } \alpha > 0, \beta > 0, z_1 \geq 0 \text{ and } z_2 \geq 0$$

with $\alpha + \beta \leq 1$. Determine the demand of inputs and the cost function of the firm [*Suggestion: Distinguish the two cases $\alpha + \beta < 1$ and $\alpha + \beta = 1$*].