

TD – Monday, November 4, 2024

Producer Theory

The following exercises should be submitted on Monday, November 4.

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

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

1. Write the production set  $Y$  associated with the production function  $f$ .
2. Determine if the production  $Y$  verifies the following basic properties: possibility of inaction, closedness, impossibility of free production (“no free lunch”), free-disposal, convexity, increasing/decreasing/constant returns to scale.

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

$$f(z) = \alpha z$$

with  $\alpha > 0$  and  $z \geq 0$ .

1. Write the profit maximization problem (PMP) of this firm.
2. Consider the production set  $Y$  associated with the production function  $f$ . Using the shape of  $Y$  and the iso-profit lines, determine the supply of this firm.
3. Determine the profit function of this firm.