

例：生产函数

已知生产函数

已知生产函数为 $Q = 10L^{0.5}K^{0.5}$ ，且 $L=10$

(1) 求成本函数

$$C = 10L + K$$

$$= 10L + 10K$$

(2) 求该函数的弹性

$$MP_L = \frac{\partial Q}{\partial L} = \frac{10 \times 0.5 L^{-0.5} K^{0.5}}{1} = \frac{5K^{0.5}}{L^{0.5}}$$

$$MP_K = \frac{\partial Q}{\partial K} = \frac{10 \times 0.5 L^{0.5} K^{-0.5}}{1} = \frac{5L^{0.5}}{K^{0.5}}$$

$$MP_L = 5L^{-0.5}K^{0.5}$$

$$MP_K = 5L^{0.5}K^{-0.5}$$

(3) 求该函数的弹性

$$MP_L = \frac{5K^{0.5}}{L^{0.5}}$$

$$L \uparrow, K \downarrow, MP_L \downarrow$$

所以该函数是凹函数

$$\frac{d(MP_L)}{dL} = -\frac{5K^{0.5}}{2L^{1.5}} < 0$$

(1) 求该函数的成本函数

$$C = 10L + K = 0$$

$$\frac{\partial C}{\partial L} = \frac{\partial C}{\partial K} = 0$$

$$\frac{\partial C}{\partial L} = 10$$

$$\frac{\partial C}{\partial K} = 1$$

$$Q = 10L^{0.5}K^{0.5}$$

$$\frac{\partial Q}{\partial L} = \frac{\partial Q}{\partial K}$$

$$\frac{5K^{0.5}}{L^{0.5}} = \frac{5L^{0.5}}{K^{0.5}}$$

$$\frac{L^{0.5}}{K^{0.5}} = \frac{K^{0.5}}{L^{0.5}}$$

$$\frac{L}{K} = \frac{K}{L}$$

$$L^2 = K^2$$

$$L = K$$

$$Q = 10L^{0.5}L^{0.5}$$

$$Q = 10L$$

$$L = 0.1Q$$

$$L = K = 0.1Q$$

$$L = K = 0.1Q$$

$$L = K = 0.1Q$$

(2) 求该函数的成本函数

$$L^2 = K^2 = 0.1Q$$

$$TC = 10 \times 0.1Q + 10 \times 0.1Q$$

$$= 2Q$$

$$AC = \frac{TC}{Q} = \frac{2Q}{Q} = 2$$

$$MC = \frac{dTC}{dQ} = 2$$

(3) 求该函数的成本函数

$$TC = 2 \times 10 = 20$$