

Class - 5

Homogeneous functions and Euler's theorem:

1. State and prove Euler's theorem for a function of two variables.
2. Verify Euler's theorem for the function $u = \frac{1}{\sqrt{x^2+y^2}}$.
3. Find the marginal productivities of capital (K) and labour (L) if $P = 10L + 0.1L^2 + 5K - 0.3K^2 + 4KL$ when $K = L = 10$. (Hint: Marginal productivity of labour: $\frac{\partial P}{\partial L}$ and Marginal productivity of capital : $\frac{\partial P}{\partial K}$
Ans: $\frac{\partial P}{\partial L}(10, 10) = 52$; $\frac{\partial P}{\partial K}(10, 10) = 39$
4. Verify Euler's theorem for the production function $P = 4L^{\frac{3}{4}}K^{\frac{1}{4}}$ (Hint: Marginal productivity of labour: $\frac{\partial P}{\partial L}$ and Marginal productivity of capital : $\frac{\partial P}{\partial K}$)
5. Find the degree of the homogeneity of the function $f(x, y) = \frac{xy}{x+y}$ and determine whether Euler's theorem holds?