

Assignment-5

1. Prove function $f(x, y) = x \log(x) + y \log(y)$, where $x, y > 0$, is convex.
2. Solve following minimization problem by Lagrange multiplier.

$$\begin{aligned} \text{Min. } & f(x, y) = xy \\ \text{s.t. } & 4x^2 + y^2 = 8 \end{aligned} \tag{1}$$

3. Solve following Maximization problem by Lagrange multiplier.

$$\begin{aligned} \text{Max. } & f(x, y) = 4y - 2z \\ \text{s.t. } & \begin{cases} 2x - y - z = 1 \\ x^2 + y^2 = 1 \end{cases} \end{aligned} \tag{2}$$

- Hints

1. Submission due: **2024/Dec./17**
2. Submit to lecwlzhao@163.com, email title “assignment5_your-name + your student number”