Mathematics Preparatory Course - MSc in EEBL

Optimization

Exercises

1.

$$\max_{x,y} \quad f(x,y) = -y^2 + xy$$

$$s.t. \quad g(x) = x - 2y = 0$$

2.

$$\max_{x,y} \quad f(x,y) = y \ln x$$

$$s.t. \quad g(x) = xy = 1$$

3.

$$\max_{x,y} \quad f(x,y) = xy - y^2 + 3$$

$$s.t. \quad g(x) = x + y^2 - 1 = 0$$

4. Study the stationary points of the following function.

$$\max_{x,y} \quad f(x,y) = x^2 + y^3 - xy$$

5. Study the domain and the stationary points of the following function.

$$f(x,y) = \ln\left(\frac{xy}{(1+x^2)e^y}\right)$$

6.

$$\max_{x,y} \quad F(x,y,z) = x + 3y - z$$

$$s.t. \quad g(x,y,z) = x^2 + y^2 - z = 0 \quad \text{and} \quad h(x,y,z) = z - 2x - 4y = 0$$