

HW 11

Using paper, pencil and the optimality conditions determine minimizers/maximizers of the following functions given constraints:

1) $f(x_1, x_2) = x_2$, subject to $x_1^2 + x_2^2 \leq 1$, $-x_1 + x_2^2 \leq 0$, $x_1 + x_2 \geq 0$.

2) $f(x_1, x_2) = x_1^2 + 2x_2^2$, subject to $x_1^3 + x_2^3 \leq 1$ and $x_1^2 + x_2^2 \geq 1$.

3) $f(x_1, x_2) = x_1 + x_2$, subject to $\ln x_1 + 4 \ln x_2 \geq 1$.

4) Solve the problem: maximize $f(x) = c^T x$, subject to $x^T Q x \leq 1$, where Q is a positive definite symmetric matrix. What is the solution when the function is minimized?