TD 5

Exercise 1:

1. Minimize the function $f(x,y)=x^2+y^2$ subject to the equality constraint $h(x,y)=x+y-1=0$.
2. Maximize the function $f(x,y)=\cos(x)+\sin(y)$ subject to the equality constraint $x+y=\pi/2$.
3. Verify the solutions and check for the second-order condition (Hessian matrix) to ensure that the critical point(s) correspond(s) to minima.

Exercise 2:

1. Minimize the function $f(x,y,z)=x^2+y^2+z^2$ subject to the equality constraints:
   - $x+y+z=14$
   - $x^2+y^2-z=4$
2. Verify the solutions and check for the second-order condition (Hessian matrix) to ensure that the critical point(s) correspond(s) to minima.

Exercise 3:

1. **Maximize** the function $f(x,y)=x^2+y^2-xy$ subject to the constraints:
   - $x+y=10$
   - $x^2+2*y\leq 30$
2. Verify the solutions and check for the second-order condition (Hessian matrix) to ensure that the critical point(s) correspond(s) to maxima.