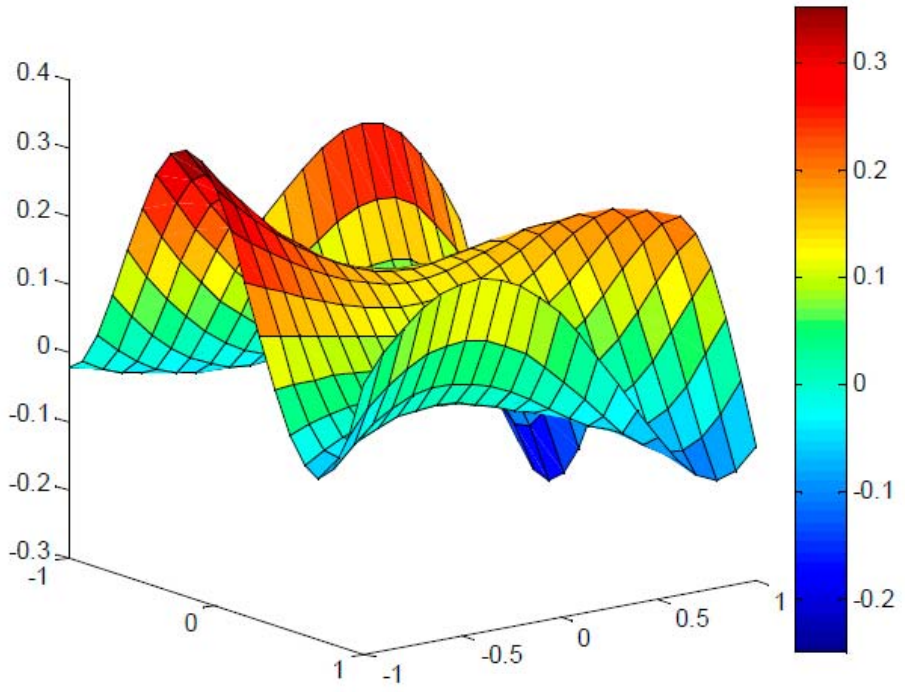
EXERCISE 1: GRADIENT DESCENT

Given the function $f(x,y) = \sin\left(\frac{1}{2}x^2 - \frac{1}{4}y^2 + 3\right) * \cos(2x + 1 + e^y)$ determine the minimum of the function and the minimum direction in the point [0.5, 0].



a) Use 0.1 as size step. How many iterations have been done?

b) Change the size step at 0.01. How many iterations have been done now?

c) And, if you change the size step at 1, what happens?

d) Can you think any way to determine the size step that minimizes the number of iterations?

EXERCISE 2: NEWTON'S METHOD

Use the Newton algorithm to determine the minimum of the function $f(x,y) = 100(x^2 - y^2) + (1 + x)^2$ taking the point (10, 10) as initial value.