Analysis III for Engineering Students Homework Sheet 4

Exercise 1:

a) Compute Taylor polynomial of second degree about a point $(x_0, y_0, z_0) = (0, 0, 0)$ of the following function

$$f(x, y, z) = x - y + (x - z)^{2} + (y - z)^{3}$$
.

b) Compute Taylor polynomial of third degree of the following function

$$f(x,y) = x + (y+1)\cosh(x+y)$$

about a point (0,0).

Exercise 2:

Given the function $f(x,y) = 9x^4 - 12x^2y + 4y^2$

- a) compute all stationary points of f,
- b) try to classify stationary points using the sufficient optimality condition,
- c) prove that f has a strict local minimum along every straight line going through zero,
- d) classify all stationary points of f,
- e) plot the function for example using Matlab commands 'ezsurf' and 'ezcontour'.

Submission deadline: 9.12.2022