

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

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

Submission deadline: 8.12.2023