

Analysis III for Engineering Students

Homework sheet 7

Exercise 1:

Verify Green's theorem for the vector field

$$\mathbf{f}(x, y) = (x^2 + y, \sin x)^T$$

and the area G enclosed by the function $y = 1 - (x - 1)^2$ and the x axis.

Exercise 2:

Given the saddle area

$$S = \{(x, y, z)^T \in \mathbb{R}^3 \mid x^2 + y^2 \leq 4, z = xy\}$$

- a) derive a parameterization of S ,
- b) plot S using the MATLAB function 'ezgraph3' and
- c) calculate the area of S using a surface integral.

Submission deadline: 3.2.2023