

Assignment 9

- A. Write a MATLAB script `Assignment9A_Groupxx.m`¹ that finds a minimum and a maximum of the function

$$f(x, y) = x \cdot y$$

under the constraint

$$x^2 + y^4 = 1.$$

Create a plot with contour lines of $f(x, y)$ and the constraint curve. Show the minimum and the maximum in the plot.

- B. Write a MATLAB script `Assignment9B_Groupxx.m`¹ that

1. loads the data vector \mathbf{x} from the file `Data_Assignment09.mat`
2. creates a function handle for the so-called log-likelihood function

$$\ell(m, s) = \sum_{i=1}^n \log \frac{1}{\pi s [1 + (x_i - m)^2 / s^2]}$$

3. finds the values \hat{m} and \hat{s} that maximize $\ell(m, s)$
4. plots the contour lines of $\ell(m, s)$ in the rectangle $3 \leq m \leq 5$ and $1 \leq s \leq 3$ for the following function values: $\ell(\hat{m}, \hat{s}) - 1, \ell(\hat{m}, \hat{s}) - 4, \ell(\hat{m}, \hat{s}) - 9, \ell(\hat{m}, \hat{s}) - 16$
5. computes the inverse Hesse matrix of $-\ell(m, s)$ at (\hat{m}, \hat{s}) .

☛ Pack both scripts in a zip file with the name `Assignment09_Groupxx.zip`.

¹xx is your group number