MATH 104: HOMEWORK 3

DUE DATE: IN CLASS – MONDAY, MARCH 4, 2024

Fulbright University, Ho Chi Minh City, Vietnam

Problem 1. Consider the following function

$$f(u,v,w) = \begin{pmatrix} u^2v^{-3}w \\ 2u - 5w \\ uv - vw \end{pmatrix}.$$

(1) Compute the derivative $[Df]$
(2) Evaluate this derivative at the point $(1,-1,2)$.
(3) What is the most sensitive output?

Problem 2. Consider the following square matrix, depending on variables x and y

$$A = \begin{pmatrix} x & 1 & 7x \\ 0 & 2 & y \\ 0 & x & 3y \end{pmatrix}.$$

(1) Compute and simplify the determinant $\det(A)$.
(2) Define $\text{sum}(A)$ to be the sum of all nine entries of the matrix A. Compute and simplify $\text{sum}(A)$.
(3) Define

$$f(x,y) = \begin{pmatrix} \det(A) \\ \text{sum}(A) \end{pmatrix}.$$

Compute $[Df]$.

Date: February 25, 2024.