

HOMEWORK 7

due date: April 10, 2018

a) Show that the system of equations

$$\begin{aligned}x^3 + 2y^3z + xz^3 &= 1, \\xy + xz + 2yz &= -1\end{aligned}$$

defines unique functions $x(y)$, $z(y)$ on a neighborhood of -1 with x having values in a neighborhood of 1 and z having values near 0. Show that these functions are of class C^1 and compute $x'(-1)$, $z'(-1)$.

b) Let

$$A = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 6 & 7 & 8 & 9 & 10 \\ 11 & 12 & 13 & 14 & 15 \\ 16 & 17 & 18 & 19 & 20 \\ 21 & 22 & 23 & 24 & 25 \end{pmatrix}$$

and

$$C_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}, \quad C_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 \end{pmatrix}, \quad C_3 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 2 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}.$$

Compute C_1A , C_2A , C_3A and write how the matrix A changed after multiplication by C_1 , C_2 , C_3 (from the left). What happens to A if we multiply it by C_1 , C_2 , C_3 from the right?