Universität Zürich
Institut für Informatik

HS 2023

Student Name:
Matrikel-Nr:

Numerical Methods in Informatics - Exercise 2

Hand out: 19.10.2023 - Due to: 01.11.2023

Please upload your solutions to the Olat system.

Theory

2.1 Matrix Factorization and Subspaces

a) (20 Min, 6 Points) LU Factorization

Please calculate the LU factorization ($A = LU$) without pivoting of the following matrix step by step:

$$A = \begin{pmatrix} 2 & 4 & 6 & 2 \\ 1 & 3 & 9 & 2 \\ 4 & 10 & 15 & 6 \\ 5 & 8 & 7 & 4 \end{pmatrix}$$

b) (30 Min, 4 Points) Subspaces

Given the matrix A, find a basis for $ColA$ and a basis for $NulA$

$$A = \begin{pmatrix} -6 & 18 & -4 & -14 \\ 4 & -12 & 8 & 16 \\ 3 & -9 & -2 & 2 \end{pmatrix}$$