

Homework 3

Numerical Linear Algebra

September 14, 2017

1 Problems for everybody

1. Determine the SVD of the following matrices:

$$A = \begin{bmatrix} 3 & 0 \\ 0 & -2 \end{bmatrix}, \quad B = \begin{bmatrix} 2 & 0 \\ 0 & 3 \end{bmatrix}, \quad C = \begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}, \quad D = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}.$$

2. Consider the matrix

$$A = \begin{bmatrix} -2 & 11 \\ -11 & 5 \end{bmatrix}.$$

- Determine, on paper, the SVD of A .
- What are the 1, 2 and ∞ norms of A ?
- Find A^{-1} using the SVD.

3. Problem 5.1.

2 Problems for computer science students

1. Problem 4.3.

3 Problems for MST graduate students

1. 5.2, 5.4