

A2 2.midterm–retake – 2020.05.20.

The student acknowledges that he / she has not used a prohibited tool while writing the midterm!

Meaning of letters in the questions:

A: Last number of You phone number (1-10)

B: Last number of You ID card (or passport) (1-10)

Questions:

1. Determine the rank of the following matrix:

$$\begin{bmatrix} A & 1 & 0 & B & 0 \\ 0 & 1 & 3 & 3 & -3 \\ 2 & 0 & 0 & 2 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & -2 & -1 & -1 & 1 \end{bmatrix}$$

2. Give the matrix of the following spatial transformation: rotation around y axis by $A \cdot 45^\circ$ after shear in the direction of z by the factor B .

3. Determine the eigenvalues and eigenvectors of the following matrix:

$$\begin{bmatrix} A + B - 3 & 5 - A - B & 20 - 2A + B \\ 5 - A - B & A + B - 3 & 2A - B - 20 \\ 20 - 2A + B & 2A - B - 20 & 4A + B - 28 \end{bmatrix}$$

4. Diagonalize and determine the 4th power of the matrix in the previous question.

All question worth 5 points. You need reach at least 6 points to pass.