

## LINEAR ALGEBRA

### HOMEWORK 4

- (1) Find the inverse of the matrix

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 0 & 2 & 3 \\ 1 & 2 & 4 \end{pmatrix}.$$

- (2) Find the solution of the linear system

$$x + 2y + 3z = 4$$

$$2y + 2z = 2$$

$$x + 2y + 4z = 3$$

- (3) Find the inverse matrix of

$$\begin{pmatrix} 1 & 1 & 0 & 0 \\ 1 & 2 & 0 & 0 \\ 0 & 0 & 3 & 5 \\ 0 & 0 & 1 & 2 \end{pmatrix}$$

- (4) Find a basis for the solution space of the homogeneous system  $Ax = 0$ , where

$$A = \begin{pmatrix} 1 & -1 & 1 & -2 & 1 \\ 3 & -3 & 2 & 0 & 2 \end{pmatrix}.$$

(In such problems it is understood that the vector  $x$  of unknowns has the right dimensions, i.e., that it has coordinates  $x_1, \dots, x_5$ .) What is the rank of  $A$ ? What is the dimension of its null space? Find a basis for the column space of  $A$ .