Linear algebra, WNE, 2018/2019
meeting 4.

11 October 2018

Problems

1. Check whether the following subsets of $\mathbb{R}^2$ satisfy any of the conditions from the definition of vector subspace.

   - $\{(x,y)\colon x,y \in \mathbb{Z}\}$,
   - $\{(x,y)\colon |x| - |y| = 1\}$.

2. For which real numbers $s \in \mathbb{R}$ set $W = \{(x,y,z,w) \in \mathbb{R}^4 \colon x - 2y + z + w = s^2 - 1 \text{ and } x + y + sw^2 = w^2\}$ is a vector subspace?

3. Is $(1,1,1,1) \in \mathbb{R}^4$ a linear combination of $(1,2,4,3),(0,1,3,3),(1,2,1,5)$?

4. Let $\alpha_1 = (3,2,1,1), \alpha_2 = (2,7,2,1), \alpha_3 = (1,3,1,3)$ and $\beta_1 = (2,-2,0,3), \beta_2 = (1,1,1,1)$, $\beta_3 = (-1,3,1,10)$. Which of vectors β_i are linear combinations of system of vectors $\alpha_1, \alpha_2, \alpha_3$?

5. Is $(1,2,-1,2),(1,4,2,8),(-1,0,4,4)$ a linearly independent system of vectors?

Homework

Group 8:00

1. Check whether the following subsets of $\mathbb{R}^2$ satisfy any of the conditions from the definition of a linear subspace.

   - $\{(x,y)\colon x = 0 \text{ or } y = x\}$,
   - $\{(x,y)\colon x^2 + 4y^2 = 4xy\}$.

2. Are the following systems of vectors:

   - $(3,2,0),(-1,0,2),(4,2,1)$,
   - $(4,2,1,-2),(5,0,-1,6),(1,1,2,2)$

   independent?

Group 9:45

1. Check whether the following subsets of $\mathbb{R}^2$ satisfy any of the conditions from the definition of a linear subspace.

   - $\{(x,y)\colon x = 0 \text{ or } y = 0\}$,
   - $\{(x,y)\colon x^2 + y^2 = 2xy\}$.

2. Are the following systems of vectors:

   - $(3,2,1),(-1,0,2),(4,2,2)$,
   - $(4,2,1,-2,3),(5,0,-1,6,1),(1,1,2,2,0)$

   independent?