

Mathematical analysis 2, WNE, 2018/2019

meeting 6. – homework solutions

7 March 2019

Group 8:00

Consider a function $\|(x, y)\| = |xy|$. Which of the conditions from the definition of the norm are satisfied by this function? Which are not? Why?

It does not satisfy the first condition, because $\|(1, 0)\| = 0$, and this is a non-zero vector.

It does not satisfy the second condition, because $\|2(1, 1)\| = 4 \neq 2 \cdot \|(1, 1)\| = 2 \cdot 1$.

It does not satisfy the third condition, because $\|(1, 1) + (1, 1)\| = 4$, but $\|(1, 1)\| + \|(1, 1)\| = 2$.

Group 9:45

Consider a function $\|(x, y)\| = |x + y|$. Which of the conditions from the definition of the norm are satisfied by this function? Which are not? Why?

It does not satisfy the first condition, because $\|(1, -1)\| = 0$, and this is a non-zero vector.

It satisfies the second condition: $\|a(x, y)\| = |ax + ay| = |a||x + y| = |a|\|(x, y)\|$.

It satisfies the second condition: $|(x, y) + (x', y')| = |x + x' + y + y'| \leq |x + y| + |x' + y'| = \|(x, y)\| + \|(x', y')\|$.