



Why

All continuous functions between norm spaces are bounded linear functions.

Result

Proposition 1. *Let $((V_1, F), \|\cdot\|_1)$ and $((V_2, F), \|\cdot\|_2)$ be two norm spaces. Let $f : V_1 \rightarrow V_2$ be a linear function between two norm spaces. Then*

1. $\exists x \in V_1$ such that f is continuous at x ,
2. f is continuous,
3. f is uniformly continuous, and
4. f is bounded,

are all equivalent conditions.

