



## Why

For any normed vector space, the vector operations are continuous. We can abstract this notion.

## Definition

A *topological vector space* is triple whose first coordinate is a vector space, whose second coordinate is a topology on the field of the vector space and whose third coordinate is a topology on the set of vectors, *such that* the vector operations are *continuous* with respect to their product topologies.

## Motivating example

**Proposition 1.** *Suppose  $(V, \|\cdot\|)$  is a normed vector space. Then the vector operations are continuous with respect to the topology induced by the metric induced by the norm.*



