



# Bounded Functions

## 1 Why

Lots of things are bounded.

## 2 Definition

A *bounded function* between two norm spaces is one for which the result of any vector in the first space is less than or equal to some constant times the norm of the vector in the second space. The constant does not depend on the vector so selected.

Such functions can only “scale” a vector so much.

### 2.1 Notation

Let  $((V_1, F_1), |\cdot|_1)$  and  $((V_2, F_2), |\cdot|_2)$  be two vector spaces. Let  $f : V_1 \rightarrow V_2$ . We call  $f$  bounded if there exists a real number  $C$  such that

$$|f(v)|_2 \leq C|v|_1$$