

## Normed Linear Spaces Exercises

1) Prove the following: for any  $x, y$  in a normed linear space,

$$\|x\| - \|y\| \leq \|x - y\|$$

2) Prove that if  $x_n \rightarrow x$  is a convergent sequence in a normed linear space, then  $\|x_n\| \rightarrow \|x\|$

3) Prove that  $\sum_{n=0}^{\infty} a\delta^n = \frac{a}{1-\delta}$  for  $\delta \in (0, 1)$ .