Therefore, $T$ is uniformly continuous on $X$.

Proof.

$\mathcal{A}$ bounded, say $\mathcal{A} = \{x \in X: \|x\| \leq 1\}$.

Suppose $T$ is bounded, say $\|T(z)\| \leq \|z\|$. Let $\varepsilon > 0$ and take

$\delta = \varepsilon / \|T\|$. Hence,

$\delta \mathcal{A} = \{x \in X: \|x\| \leq \|T\| \delta\}$. Suppose $T$ is bounded, say $\|T(z)\| \leq \|z\|$. Let $\varepsilon > 0$ and take

$\delta = \varepsilon / \|T\|$. Hence,

Proposition 2.8

For $t \in (\mathcal{X}, \mathcal{Y})$ and $x \in X, y \in Y$, the following are equivalent:

Theorem 2.6

Given $\mathcal{T} \in (\mathcal{X}, \mathcal{Y})$. The following are equivalent:

Chapter 2. Normed Linear Spaces: The Basics

2.4. Bounded Linear Operators—Proofs of Theorems

Introduction to Functional Analysis