

## 1. B.L.T. SUPPLEMENT

The following simple “Bounded Linear Transformation” theorem will often be used in the sequel to define linear transformations.

**Theorem 1.1** (B.L.T. Theorem). *Suppose that  $Z$  is a normed space,  $Y$  is a Banach space, and  $\mathcal{S} \subset Z$  is a dense linear subspace of  $Z$ . If  $T : \mathcal{S} \rightarrow Y$  is a bounded linear transformation (i.e. there exists  $C < \infty$  such that  $\|Tz\| \leq C\|z\|$  for all  $z \in \mathcal{S}$ ), then  $T$  has a unique extension to an element of  $L(Z, Y)$ .*

The proof of this theorem is left to the reader, Exercise 1.1.

**Exercise 1.1.** Prove Theorem 1.1