

Homework 4

October 27, 2014

(due on Tuesday November 4, 2.10pm, before class starts):

1. Let $L : C[0, 1] \rightarrow \mathbf{C}$ denote the linear functional defined by

$$L(f) = f(0).$$

- a) Show $L \in (C[0, 1], \|\cdot\|_\infty)^*$.
- b) Show $L \notin (C[0, 1], \|\cdot\|_2)^*$.

- 2 Let H be a Hilbert space and $A : H \rightarrow H$ linear self-adjoint operator defined for any $x \in H$. Show that A is continuous. [Hint:] Use Banach-Steinhaus theorem.