MATH5010 Linear Analysis (2020-21): Homework 7. Deadline: 17 Mar 2021

Important Notice:

♣ The answer paper must be submitted before the deadline.
♠ The answer paper MUST BE sent to the CU Blackboard. Please refer to the course web for details.

1. Let $1 < p < \infty$ and $\frac{1}{p} + \frac{1}{q} = 1$. Let $T : \ell_p \to \ell_p$ be the map defined by

$$T(x) := (0, x(1), x(2), ...)$$

   for $x \in \ell_p$. Under the canonical identification $(\ell_p)^* = \ell_q$, what is the adjoint operator $T^* : \ell_q \to \ell_q$?

2. Let X be a normed space over $\mathbb{C}$. Let $x, y \in X$ such that $\|x - y\| > c > 0$. Show that there is an element $f \in X^*$ such that $f(x) > c + f(y)$.

$* * *$ **End** $* * *$