THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
MATH4010 Functional Analysis 2022-23 Term 1
Homework 2

Deadline: 2022-09-29 Thursday

Notice:

- All the assignments must be submitted before the deadline.

- Each assignment should include your name and student ID number.

1. (*Bounded linear extension theorem*) Let X be a normed space and $\widetilde{X}$ its Banach completion. If f is a bounded linear functional on X, then there exists a unique linear functional $\widetilde{f}$ on $\widetilde{X}$ such that $\widetilde{f}|_X = f$ and $\|\widetilde{f}\| = \|f\|$.

2. Let X, Y and Z be normed spaces and $S\colon X \to Y$ and $T\colon Y \to Z$ bounded operators. Prove that
$$\|TS\| \le \|T\|\|S\|.$$

— THE END —