THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
MATH4010 Functional Analysis 2021-22 Term 1
Homework 2
Deadline: 2021-09-27 Monday

Notice:
- All the assignments must be submitted before the deadline.
- Each assignment should include your name and student ID number.

1. Show that vectors (e_n), where e_n is the sequence whose n-th term is 1 and all other terms are zero,

$$e_1 = (1, 0, 0, \ldots),$$
$$e_2 = (0, 1, 0, \ldots),$$
$$\ldots$$

   form a Schauder basis in ℓ^p for every $p \in [1, +\infty)$ and in the spaces c_0 and c_{00}.

2. Let $X = \{x \in C[0,1] \colon x(0) = 0\}$ with the sup-norm, and let f be a linear functional on X defined by

$$f(x) = \int_0^1 x(t)dt.$$

   Show that $\|f\| = 1$.

— THE END —