

Functional analysis 2018, homework test 1.

1. What is the “distance” between the functions $f(x) = x$ and $g(x) = x^2$ in the functions space $C[0, 1]$ with the supremum-norm $\|\cdot\|_\infty$ and the 2-norm $\|\cdot\|_2$, respectively?
2. Prove that in ℓ^1 the closed unit sphere $\overline{B}_1(0) := \{x \in \ell^1 : \|x\|_1 \leq 1\}$ is not compact.

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