

Quiz 4

Analysis

March 1, 2018

1. Let $1 < p < \infty$. Prove that if $f \in L^p_0([0, 1])$ then $f \in L^1_0([0, 1])$.

$$\begin{aligned} \int_0^1 |f(x)| dx &\leq \left(\int_0^1 |f(x)|^p dx \right)^{1/p} \left(\int_0^1 1 dx \right)^{1/q} \\ &= \|f\|_p. \end{aligned}$$

Therefore, $\int_0^1 |f(x)| dx < \infty \Rightarrow f \in L^1_0([0, 1])$.