

Homework 7 additional problems.

1. Let f be an (absolutely) integrable function on \mathbb{R}^d . Define $f_h(x) = f(x + h)$. Prove that $\|f - f_h\|_1 \rightarrow 0$ as $h \rightarrow 0$.
2. Let $f : \mathbb{R} \rightarrow \mathbb{C}$ be (absolutely) integrable. Prove that $\int_{\mathbb{R}} f(x)e^{inx} dx \rightarrow 0$ as $n \rightarrow \infty$. (Hint: Prove it first for a step function.)