Tufts University
Department of Mathematics

Math 235 **Groupwork #9 : Due on 12/8**[1] **Fall, 2023**

Problem

Fix $1 < p < \infty$, and let E be any measurable set of $\mathbb{R}^d$. Suppose that $f_n \in L^p(E)$ for all $n \geq 1$ and $f_n \to f$ a.e. Prove that if $\sup_n \|f_n\|_p < \infty$ then $f \in L^p(E)$, but show by example that the assumption that $\{f_n\}$ is a bounded sequence in $L^p(E)$ is necessary.