

Homework 2
MATH 166 - Spring 2023
Tufts University, Department of Mathematics
Instructor: James M. Murphy
Due: February 2, 2023

1. BOOK QUESTIONS

Wasserman: Chapter 5: #3, #4, #14; Chapter 6: #1

2. SUPPLEMENTAL QUESTION (CONVERGENCE IN L^p , $p \neq 2$)

For $p > 1$, we say a sequence $\{X_n\}_{n=1}^{\infty}$ of r.v. converges to a r.v. X in L^p if

$$\lim_{n \rightarrow \infty} \mathbb{E}|X - X_n|^p = 0.$$

Show that if $\{X_n\}_{n=1}^{\infty}$ converges to X in L^2 , then $\{X_n\}_{n=1}^{\infty}$ converges to X in L^1 . We sometimes call the former *convergence in mean square* and the latter *convergence in mean*.