

Stat 851 Winter 2008
Assignment #7

This assignment is due on **Monday, March 24, 2008**.

1. Let $\alpha > 0$ be fixed. Suppose that X_1, X_2, \dots are independent random variables all defined on the probability space (Ω, \mathcal{A}, P) . Suppose further that

$$P\{X_n = 0\} = 1 - \frac{1}{n^\alpha} \quad \text{and} \quad P\{X_n = n\} = \frac{1}{n^\alpha}.$$

- (a) Show that $X_n \rightarrow 0$ in probability. (Note that this result holds even without the independence assumption.)
- (b) Show that $X_n \rightarrow 0$ completely if and only if $\alpha > 1$. (Conclude that $X_n \rightarrow 0$ almost surely if and only if $\alpha > 1$.)
- (c) Show that $X_n \rightarrow 0$ in L^p if and only if $\alpha > p$.
2. Complete the following exercises from pages 148–149:
- #17.3, 17.4, 17.9, 17.10, 17.13
3. Complete the following exercise from page 73:
- #10.13