18.175 PROBLEM SET FIVE

A. Read and understand Chapter 4 of Durrett (or another text covering the same material). Write a few sentences of notes about your reading. (Hand them in, but they won't be graded. This is just to give you an excuse to take some notes.)

B. COMPLETE THE FOLLOWING PROBLEMS FROM DURRETT:

$$4.1.4, 4.1.5, 4.1.9, 4.1.12, 4.1.14, 4.4.2, 4.4.3, 4.4.5, 4.4.8$$

C. Prove that every infinitely divisible random variable X has a characteristic function of the form

$$Ee^{itX} = \exp\Big(ait - \frac{1}{2}\sigma^2 t^2 + \int \big(e^{itx} - 1 - itx1_{|x|<1}\big)W(dx)\Big),$$

for some constants a and σ and a measure W on $\mathbb{R} \setminus \{0\}$ satisfying $\int \min\{x^2, 1\}W(dx) < \infty$. Try to prove this on your own. If you end up consulting outside sources, cite your sources.

18.175 Theory of Probability

Spring 2014