205B homework #9; due Tuesday April 24

Durrett Chapter 8 Exercises 6.1, 6.2, 6.3.

1. Do the calculus to complete the proof that

\[ L := \sup \{ t \leq 1 : B(t) = 0 \} \]

has the arc sin distribution.

2. Prove the combinatorial lemma, that simple symmetric random walk

\[ S_k = \sum_{i=1}^{k} \xi_i \]

has the property: for each \( n \),

\[ |\{1 \leq k \leq n : S_k > 0\}| =_d \min\{k \leq n : S_k = \max_{0 \leq j \leq n} S_j\}. \]