STATS 218 Homework 7

Due date: Monday, May 23

Problem 1 (Ross Ex. 8.6)

Let $\{X(t), t \geq 0\}$ denote a birth and death process that is allowed to go negative and that has constant birth and death rates $\lambda_n \equiv \lambda, \mu_n \equiv \mu$, $n = 0, \pm 1, \pm 2, \cdots$. Define μ and c as functions of λ in such a way that $\{cX(t), t \geq u\}$ converges to Brownian motion as $\lambda \to \infty$. *Note:* The definition of birth and death process can be found in Section 5.3 of Ross.

Problem 2 (Ross Ex. 8.7)

Let $\{X(t), t \geq 0\}$ denote Brownian motion. Find the distribution of

(a) $|X(t)|$

(b) $|\min_{0 \leq s \leq t} X(s)|$

(c) $\max_{0 \leq s \leq t} X(s) - X(t)$.