HELSINKI UNIVERSITY OF TECHNOLOGY	Exercise 9
Networking Laboratory	5.4.2004
S-38.215 Special Course in Networking Technology, Spring 2004	Aalto

- 1. (Lawler, Exercise 8.6) Suppose X_t is a standard Brownian motion and $Y_t = a^{-1/2}X_{at}$ with a > 0. Show that Y_t is a standard Brownian motion.
- 2. (Lawler, Exercise 8.7) Suppose X_t is a standard Brownian motion and $Y_t = tX_{1/t}$. Show that Y_t is a standard Brownian motion. (*Hint*: If U and V are normally distributed, then a sufficient and necessary condition for their independence is E[UV] = E[U]E[V].)
- 3. (Lawler, Exercise 8.8) Let X_t be a standard Brownian motion. Compute the following conditional probability:

$$P\{X_2 > 0 \mid X_1 > 0\}.$$

Are the events $\{X_1 > 0\}$ and $\{X_2 > 0\}$ independent?