



Suppose $\|x\| = b - \epsilon$. (WLOG assume, $x = (0, -b + \epsilon)$)
 Write $B_t = (X_t, Y_t)$ (planar case for simplicity)

$$\begin{aligned}
 \text{Then } P_x \{ B \text{ hits inner circle before outer} \} \\
 &\leq P_x \{ B \text{ hits } L' \text{ before } L \} \\
 &= P_x \{ Y \text{ hits } (b-a-\epsilon) \text{ before } -\epsilon \} \\
 &= \frac{\epsilon}{b-a} \quad (\text{i-dimensional gambler's ruin}).
 \end{aligned}$$

Thus, $\phi(x) = P_x \{ B \text{ hits outer circle before inner} \}$
 $\rightarrow 1$ as $x \rightarrow$ outer boundary.

Continuity at the inner circle seems to be more tricky. ~~The ~~seem~~~~
 (There seems to be no way to ~~make~~ ^{correct} the argument I was trying
 to give in class.)

Comments are welcome.