

Problem Set #2

Solutions

February 25, 2000

It seems that the only troublesome problem was #7, mostly due to its extremely confusing statement. The reflection can be performed only with respect to the time axis (i.e., "along" $t=k$). Otherwise the segments do not connect after the translation is performed (you can "slide" along the time axis, but not along the ordinate - random walk cannot have gaps).

Virtually everybody showed the bijection, in one way or another. However, the crucial thing was to explain why this bijection yields the equal probabilities. Since you can have multiple minima in the original random walk, and therefore zeros in the transformed one, it is not obvious, unless you refer to the statement 3.4 on page 77.

It says that the lemma can be restated as

$$P\{S_1 \geq 0, \dots, S_{2n} \geq 0\} = \frac{1}{2^{2n}} N_{2n,0} = u_{2n}.$$