

Public Abstract

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Brownian motion is a well-studied phenomenon in the physical sciences. Roughly speaking, Brownian motion is the (seemingly) random motion of a particle caused by collision with other particles. Such behavior occurs in problems involving heat flow and was developed in large part by Einstein. This is the motivation for this dissertation. In trying to understand this, one may ask the following question: given a region in say, 2D or 3D, what is the probability that a particle starting at a specific point in the region exits the region the first time through a given portion of the boundary under Brownian motion? This dissertation shows, among other things, that under mild hypotheses if the portion of the boundary in question has non-zero length in 2D (or surface area in 3D) then this probability is always positive.