

The thesis deals with testing hypotheses about the parameters of the Wiener process with a constant drift rate and instantaneous variance. The tests are based on the first time, when the process reaches a pre-specified boundary point. We consider a process with a non-negative drift rate, and we observe hitting a positive point. We focus on tests about the drift rate, in particular about the absence of any drift. We first study several basic properties of the Wiener process and its connection with the Wiener process with a drift. Using these, we derive distributional properties of the first hitting time. We also describe selected hypotheses testing techniques in the setting of exponential families.

We construct uniformly most powerful unbiased tests of one parameter in the presence of a nuisance parameter. Further, we construct uniformly most powerful tests of hypotheses about the drift rate, while the variance is known, and we study this situation in more detail. Finally, we construct asymptotic simultaneous tests of both parameters based on the Rényi divergences.