

In this thesis we research and introduce several properties of paths of a Wiener process. At first we present a way to prove existence of a Wiener process and then we discuss its basic properties. The second chapter is devoted to analytical properties of Wiener's paths including monotonicity, differentiability, Hölder continuity and quadratic variation. In the third chapter we research the reflection principle and the distribution of maxima of paths in the case of a random walk and then also in the case of a Wiener process. The fourth chapter concentrates on the Skorohod embedding and its application in the proof of the classic central limit theorem. Finally, using the results of the first chapter we simulate a path of a Wiener process and illustrate some of the properties discussed earlier. To demonstrate the concepts, several problems were included in the relevant chapters together with an author's solution.