This Diploma thesis deals with principles, asymptotic properties and comparison of bootstrap methods for dependent observations. In the first chapter principal ideas and benefits of bootstrap method for independent data are introduced. Subsequently, these knowledge are applied to data exhibiting dependency. Block, frequency and sieve bootstrap methods are presented. Afterwards, principle of each method is described in broader context, asymptotic properties are presented and some of them are derived. Strong dependency of block bootstrap method on block length is discussed and algorithms for empirical choice of optimal block length are described. The main aim of this work is to compare discussed methods from theoretical point of view and via simulation study. Eventually, a few examples, which are based on real data sets, are presented. Discussed principles are implemented in software R and software Fortran.

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