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Bootstrap Methods in Time Series Analysis

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Abstract

Bootstrap methods can be used to non-parametrically make inference about a sample estimates e.g. through its bias, standard error and confidence intervals. In this thesis we consider four different block bootstrap methods, namely the non-overlapping block bootstrap (NBB), moving block bootstrap (MBB), circular block bootstrap (CBB) and stationary bootstrap (SB) which are commonly used for data correlated in time. The purpose of the thesis is to quantify and compare the efficiency of the block bootstrap methods. We do this by simulations of linear time series models such as the AR and MA model and evaluate the bootstrap methods in estimating the sample mean as well as refit the model parameters and autocorrelation when varying sample size and block length.

We find that the methods preform different when sample size and block length varies, but common for all methods is that the dependence is underestimated compared to the true underlying model. The conclusion is that methods using overlapping blocks are to be preferred over non-overlapping blocks and that random block lengths leads to a larger variance of the parameter estimates than for the other methods when block length is fixed.

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