

Mathematical Statistics Stockholm University Master Thesis **2022:13** http://www.math.su.se

## Gradient Boosted Trees Applied to Chain-Ladder Reserving

## Fredrik Käll\*

## September 2022

## Abstract

This thesis investigates whether non-life claims reserving can be improved by using more information regarding each claim and machine learning techniques. As a foundation, Wühtrich's article *Neural Networks applied to Chain-Ladder reserving* has been used, with the modification that Gradient Boosted Trees have been used instead of Neural Network. We begin by obtaining a model by walking through the fitting process. The model is then used to predict the outstanding reserves and compared to Mack's Chain-Ladder predictions. Further, a comparison of the two models MSEP is made to investigate the variation of the two models. The comparison shows that the Gradient Boosted Trees perform as well as Chain-Ladder for earlier, more developed years. However, in later years, the performance is not as good. We end the thesis with a discussion on why the boosted trees did not perform well and what could be done to improve the predictions.

<sup>\*</sup>Postal address: Mathematical Statistics, Stockholm University, SE-106 91, Sweden. E-mail: fredrik.kall@outlook.com. Supervisor: Mathias Lindholm.