

My research - by Jostein Paulsen

My research interests have changed quite a bit during the years. My PhD was about time series, but afterwards I went to work for an insurance company in Norway, this company is today part of the Tryg Group. There I got interested in insurance problems, but even more in mathematical finance. This was in the mid 1980's, the yuppies were riding high and the Black-Scholes formula was the talk of the town.

Always interested in probability theory and stochastic processes, after returning to the university I set out to learn more about these things. Looking out for a good problem (I was a bit tired of time series), on a sabbatical to the University of Illinois, Urbana Champaign I decided that the combination of classical risk theory with basic ideas from mathematical finance could be an interesting topic, and I kept working on this for some years. My research was concentrated on ruin theory, a topic that goes back to people like Lundberg, Cramér and Feller.

Using basically the same underlying models I later progressed to control theory. The problem with control theory was that it can be quite technical, figuring out how to solve the problems is fun, but reading other people papers can be arduous and quite boring as well. In that sense ruin theory was more fun.

Even though I have only written a few papers in statistics since my PhD, the topic has always interested me. Coming from a much smaller university, teaching was less specialized than here, therefore we had to teach several different classes. So when I started in Copenhagen, I had to decide what to teach, and I concluded that there could be a need for a more statistically oriented class for our actuarial students. This suited me fine, for the last 20 years I have worked as a consultant for a marine insurance company in Norway so I have some knowledge of the practical problems that one can face when using data to price insurance policies.

With a fair amount of lecture notes from Bergen, Copenhagen and the University of Chicago, I decided to write a book on statistics in non-life insurance. Based on my theoretical and practical experience that sounded like a good idea to me.

Unfortunately it has not been easy to say enough is enough, and as the work progressed more and more material has been included. One major expansion is due to machine learning. When I started there were not many people in the insurance business that cared about it, but now it has become a big fad in non-life insurance.

Therefore, it was desirable to include some machine learning, but that was like opening Pandora's box, new stuff continued to flow out. Teaching a class in machine learning and having lots of master students writing their theses has helped to get a better grasp and learn new material. In a way, writing this book has made the task of supervising master students more interesting and rewarding, and conversely I have benefited a lot from their work. As we know there are quite a few excellent students in our group.

But machine learning is not the only topic that has made the book grow. Whenever I was thinking that now everything is covered, some new interesting topic appears. There are chapters about computational statistics, bootstrap, optimization, insurance economy, risk theory, bonus-malus systems, risk management and so on. I even have a lengthy chapter about the beginning of it all, time series. So the circle is complete!

What started as a book of 300-400 pages has now grown into a three volume book set with more than 500 pages in each volume. There are presently 42 chapters and 7 theoretical appendices. In addition there are over 300 pages with solutions to problems. Hopefully there will not be much more, but I guess I have to explore whether causality theory is relevant. And then there is the proof reading, not a small task!