Program of the course "Non-Life Insurance'

Mark Kelbert

Approved by

the academic council of the program

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Author	Mark Kelbert
Credits	3
Contact hours	40
Self-study hours	74
Course	1

1 Introduction

Apart from the introduction into the standard actuarial theory, this course handles various methods of solving popular problems of non-live insurance that are relevant for actuarial practice, for instance, the rating of automobile insurance policies, premium principles and evaluation of contingencies in advanced ruin models. All methods, considered in this course, require only few assumptions about the probabilistic properties of the model, from which the data is obtained. The course reflects the state-of-the-art in actuarial risk theory. In addition to basic topics which are compatible with official material of actuarial education in UK and other parts of the world, the course contains important material on topics that are relevant for recent insurance and actuarial developments including the credibility theory, reserving, ranking of risks, modelling dependencies and the use of generalized linear models, as well as $PH-$type distributions with an eye on applications to the non-life insurance. The mathematical background assumed is on a level such as acquired in the bachelors programs in quantitative economics or mathematical statistics: Calculus, Probablity Theory and Mathematical Statistics.

2 Content

-1. Marked point process
-2. Individual Risk Models.
-3. .Collective Risk Models
-4. The distribution of total claim amount
-5. Premiium principles
-6. Bonus-Malus premiums
-7. The Cramér-Lundberg model
-8. Ruin probability and Lundberg inequality

-9. Reinsurance treaties
-10. Ruin theory for recurrent input flows.
-11. Phase-type distributions in Non-Life Insurance
-12. Credibility theory
-13. The Buhlmann-Straub model
-14. Introduction into Lévy processes
-15. Ruin theory for Lévy models

3 Recommended literature

Main list.
1. M.Kelbert, Insurance Mathematics by Problems and Examples, MCCME. 2019 (in press)
2. R. Kaas, H. Goovaerts, J. Dhaeue, M. Denuit. Modern Actuarial Risk Theory, Springer 2002
https://link.springer.com/book/10.1007/b109818

Additional literature
1. S. Klugman, Bayesian Statistics in Actuarial Science with Emphasis on Credibility, Springer, 1992
https://link.springer.com/book/10.1007/978-94-017-0845-6
2. J. Lemaire, Automobile Insurance, Springer 1985
https://link.springer.com/book/10.1007/978-94-015-7708-3

4 Student evaluation

The final evaluation grade of the students is calculated according to the formula:

$$[\text{Final mark}] = 0.3 \times [\text{cumulative mark for the work during the modulus}] + 0.3 \times [\text{mark for the intermidiate written test }] + 0.4 \times [\text{mark for the final test}].$$

The cumulative mark for the work during the modulus is based on the mark for the home tasks and on the activity during the seminars.