Lehrstuhl für Finanzmathematik
Fakultät für Mathematik
Technische Universität München

Announcement WiSe 2020/21

Lecture in Mathematical Finance

Insurance Mathematics 1

Prof. Dr. Matthias Scherer

Area: / Modulnr.: Mathematical Finance / MA3405

Course Structure: Lecture: 4h Exercises: 2h

Content: This course introduces the principles of actuarial science with a focus on non-life insurance. We cover pricing methods, capital allocation, the individual model and the collective model. The relevant stochastic models for tariff calculation, loss reserving and reinsurance are developed and discussed. Different loss-reserving methods are introduced and compared. As non-life insurance (automotive, liability, fire, etc.) is heavily influenced by the random nature of claim arrivals (frequency) and sizes (severity), stochastic tool such as credibility theory, stochastic processes, extreme-value analysis and dependence modelling are introduced in the present context. The role of reinsurance in risk-sharing is analyzed from a mathematical perspective. The current regulation (Solvency II) is briefly discussed.

Prerequisite: MA1401 Introduction to Probability Theory, MA2402 Basic Statistics or MA0009 Einführung in der Wahrscheinlichkeitstheorie und Statistik

Literature:

Albrecher, H., Beirlant, J. Teugels, J. (2017): Reinsurance: Actuarial and Statistical Aspects (Wiley Series in Probability and Statistics).
Bühlmann, H. (2008): Mathematical methods in risk theory. Springer, Berlin, Heidelberg, 2nd printing, 1st edition.
Embrechts, P., Klüppelberg, C., Mikosch, T (1997): Modelling extremal events for insurance and finance, Springer Verlag.
Goelden, H.-W., Hess K., Morlock, M. Schmidt, K. Schröter, K. (2015): Schadenversicherungsmathematik (Deutsch).
Mikosch, T. (2009): Non-life insurance mathematics, Springer, Berlin, Heidelberg.
Mack, T. (2002): Schadenversicherungsmathematik. Verlag Versicherungswirtschaft, Karlsruhe.
Van Eeghen, J. et al. (1983): Rate Making, Nationale Nederlanden, Rotterdam.
Schmidli, H. (2017): Risk Theory, Springer Actuarial.
Wüthrich, M. and Merz, M. (2008): Stochastic Claims Reserving Methods in Insurance, Wiley.

Certificate: Exam, 9 CP

Location/ Lecture/Exercises: see TUMonline