The Sum-Product Structure as a Mechanism for Risk Management

Qihe Tang

Department of Statistics and Actuarial Science, University of Iowa

241 Schaeffer Hall, Iowa City, IA 52242, USA

Email: qihe-tang@uiowa.edu

Abstract

The sum-product structure $\sum_{i=1}^{n} X_i \prod_{j=1}^{i} Y_j$ for n finite or infinite appears naturally in insurance and finance modeling, where the real-valued X random variables and the positive Y random variables are often interpreted as insurance risks and financial risks, respectively. This talk will demonstrate its versatility for risk management. A few new results for the heavy-tailed case will be shown.

Keywords: asymptotics; risky investments; stochastic difference equation; subexponentiality; tail probabilities

References

[1] Asmussen, S.; Albrecher, H. Ruin Probabilities. Second edition. World Scientific Publishing Co. Pte. Ltd., Hackensack, NJ, 2010.

[2] Goldie, C. M. Implicit renewal theory and tails of solutions of random equations. Annals of Applied Probability 1 (1991), no. 1, 126–166.

[3] Norberg, R. Ruin problems with assets and liabilities of diffusion type. Stochastic Processes and Their Applications 81 (1999), no. 2, 255–269.

[4] Paulsen, J. Ruin models with investment income. Probability Surveys 5 (2008), 416–434.

[5] Tang, Q.; Tsitsiashvili, G. Precise estimates for the ruin probability in finite horizon in a discrete-time model with heavy-tailed insurance and financial risks. Stochastic Processes and Their Applications 108 (2003), no. 2, 299–325.