Stochastic Models in Insurance

Organizer and Chair: Sheldon Lin (University of Toronto)

XIAOWEN ZHOU, Concordia University
Lévy Risk Processes

A Lévy process is a stochastic process with stationary independent increments. Its fluctuation behavior is relatively well understood when such a process allows only one-sided jumps. In this talk we are going to review several applications of the fluctuation theory for spectrally one-sided Lévy processes to risk models. In particular, we are going to discuss three classes of risk processes, the risk processes with dividend barriers, the risk processes with taxes and the risk processes with random observations.

CHRISTIANE LEMIEUX, University of Waterloo
Adaptive Premium Policies in Risk Theory

We present an extension of the classical risk model in which the premium rate policy is adaptive to claims experience. We assume the premium rate is reviewed each time the surplus reaches a new descending ladder height. A choice between a number m of rates is then made depending on the time elapsed between successive ladder heights. We derive explicit expressions for the probability of ruin, assuming claim sizes are mixed Erlang. We then motivate further our model by using a mixed Poisson process for the claims arrival. Finally, we discuss other applications of this method and possible related extensions.

TAEHAN BAE, University of Regina
Pricing a Motor Insurance Loss Rate Swaption

A few types of motor insurance-linked securities have recently been introduced as an effective means of managing insurance companies' liability risk. In this talk, we introduce a motor insurance loss rate swaption which gives a right for the option holder to enter into a cash flow swap contract. A risk-neutral valuation of the security, assuming that the aggregate loss follows a discounted compound Poisson process will be discussed. As an effective alternative to the computationally intensive Monte Carlo or Fourier inversion methods, we suggest a saddlepoint approximation to the risk neutral price of the hybrid derivative. Some numerical examples will be given based on a set of assumptions.