Seminar Series: Computational Finance Seminar

Date: Monday, April 24, 2017
Time: 4:30 – 5:20 p.m.
Location: REC 122

Speaker: Zhongyi Yuan
Affiliation/Organization: Department of Risk Management, Penn State University

An Extreme Value Approach to the Pricing and Basis Risk Characterization of ILS

Abstract: Insurance-Linked Securities (ILS) as a channel to transfer catastrophe risks to the capital market have been widely used by insurers to enhance their risk bearing capacity. They have developed from covering one single area/peril to multiple, and in the meantime, while traditional ILS are typically linked to natural catastrophe risks only, recent innovations have introduced ILS that are also linked to broader financial risks.

We propose a general pricing framework with a pricing measure that combines a risk-neutral measure, which prices the financial risks, and a distorted measure, which prices the natural catastrophe risks. We then use Catastrophe (CAT) bonds as an example to discuss their pricing. Furthermore, since the hedging by ILS may not be a perfect one for insurers, we propose two models to characterize the hedging basis risk, using dual-triggered Industry Loss Warranties (ILW) as an example. In our analysis we employ an extreme value approach to approximate the distribution of the ILS triggers. Finally, we show a few numerical examples to illustrate the results.