



DEPARTMENT OF
MATHEMATICS
Illinois State University

Undergraduate Colloquium

Title: Dependent Frequency-Severity Modeling of Insurance Claims

Speaker:

Professor Peng Shi

Charles & Laura Albright Professor in Business and Finance

Risk and Insurance Department--Wisconsin School of Business

University of Wisconsin-Madison

Location: STV 121

Time: 3:00-4:00pm on Thursday (03/21/2019)

Abstract: In actuarial research, a task of particular interest and importance is to predict the loss cost for individual risks so that informative decisions are made in various insurance operations such as underwriting, ratemaking, and capital management. The loss cost is typically viewed to follow a compound distribution where the summation of the severity variables is stopped by the frequency variable. A challenging issue in modeling such outcome is to accommodate the potential dependence between the number of claims and the size of each individual claim. In this article, we introduce a novel regression framework for compound distributions that uses a copula to accommodate the association between the frequency and the severity variables, and thus allows for arbitrary dependence between the two components. We further show that the new model is very flexible and is easily modified to account for incomplete data due to censoring or truncation. The flexibility of the proposed model is illustrated using both simulated and real data sets. In the analysis of granular claims data from property insurance, we find substantive negative relationship between the number and the size of insurance claims. In addition, we demonstrate that ignoring the frequency-severity association could lead to biased decision-making in insurance operations.