

Math 417A Loss Models I Fall 2007

MWF 12:00 – 12:50 Bouillon 210

Instructor: Cen-Tsong Lin

Office: Bouillon 108B, Tel: 963-2842, e-mail: ctl@cwu.edu

Office Hours: 9:00 – 10:00 Monday – Friday or by appointment

Prerequisite: Math411C

Course description:

The students will be introduced to useful frequency and severity models. They will be required to understand the steps involved in the modeling process and how to carry out these steps in solving business problems. The students should be able to:

- (i) analyze data from an application in a business context;
- (ii) determine a suitable model including parameter values; and
- (iii) provide measures of confidence for decisions based upon the model.

The students will be introduced to a variety of tools for the calibration and evaluation of the models.

Learning outcomes:

After taking this sequence, the students are expected to be familiar with survival, severity, frequency and aggregate probability models, and use statistical methods to estimate parameters of such models given sample data. The students are further expected to identify steps in the modeling process, understand the underlying assumptions implicit in each family of models, recognize which assumptions are applicable in a given business application, and appropriately adjust the models for impact of insurance coverage modifications.

Course outlines:

Probability Review

Discrete random variable: uniform, binomial, negative binomial, Poisson

Continuous random variable: uniform, normal, gamma

Multivariable probability: joint distribution, marginal distribution, conditional distribution, independent, covariance, double expectation theorem, sum of independent variables

Claim Frequency Models

Binomial, Poisson, negative binomial, geometric distribution

Creating new counting models

Mixture models

Counting process

Claim severity Models

Pareto distribution

Creating new distribution

Transforming loss random variables for insurance applications

Discrete distribution formula

The collective model

Required Text: Klugman, Panjer and Willmot, *Loss Models: From Data to Decisions*, 2nd Edition, Wiley 2004

Grading Policy

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| Two tests: (Mon) 10/15/2007 and (Fri) 11/09/2007 | 45% |
| Homework assignments | 25% |
| Final exam (Friday) 12/7/2005 12:00 – 2:00 | 30% |
| Total | 100% |

Note: Homework will be assigned daily throughout the quarter; these assignments are due one week after they are given.