Actuarial Science 427   Life Contingencies II

(see Course Descriptions for the applicable academic year: http://www.ucalgary.ca/pubs/calendar/)

Syllabus:

Main reference Text: "Actuarial mathematics for life contingent risk (Second edition)", by David C.M. Dickson, Mary R. Hardy and Howard R. Waters.

Additional Text: Loss models from data to decisions (fifth edition) by Stuart Klugman, Harry H. Panjer and Gordon E. Willmot

Topics

From the main text:

Chapter 7: Policy Values.

Chapter 8.8-8.11: Multiple decrement models.

Chapter 9.1-9.4: Joint and last survivor benefits (excluding multiple state models)

From the additional text:

 Chapter 14: Construction of empirical models.

Instructor may draw materials for assigned topics from an alternative text which uses the notation given in the main reference text.

It is intended that this course should cover an approximately one third of the syllabus for the Society of Actuaries Exam Long-Term Actuarial Mathematics (LTAM) exam. This course syllabus should be updated as needed, with this objective in mind.

Course Outcomes

By the end of this course, students will be able to:

1. Evaluate net and gross premiums for insurance policies and annuities based on different premium principles, such as the equivalence principle and the portfolio-premium principle.

2. Calculate and interpret probabilities, means, percentiles and higher-order moments of random variables associated with these premiums, including loss-at-issue random variables.

3. Calculate and interpret benefits reserves, gross premium reserves, expense reserves and modified reserves.

4. Calculate and interpret probabilities, means, percentiles and higher-order moments of random variables associated with these reserves, including future-loss random variables. Evaluate benefit reserves using recursive formulae.

5. Calculate and interpret asset shares. Calculate and interpret the effect of policy modifications.

6. Evaluate benefit reserves with continuous cash-flows using Thiele's differential equation.

7. Understand multiple state models and multiple life statuses, and be able to describe and implement applications of each.

7. Calculate nonparametric estimates of survival models using the Kaplan-Meier and Nelson-Aalen formulas for seriatim data and adaptations for grouped data.

8. Calculate, using both seriatim and grouped data, maximum likelihood estimates of transition probabilities assuming constant transition intensity during fixed age intervals.

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