Risk Theory Calculations with R and actuar

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actuar is a package providing additional Actuarial Science functionality to the R statistical system. This talk will present the features of the package targeted at risk theory calculations. Risk theory refers to a body of techniques to model and measure the risk associated with a portfolio of insurance contracts. A first approach consists in modeling the distribution of total claims over a fixed period of time using the classical collective model of risk theory. **actuar** provides functions to discretize continuous distributions and to compute the aggregate claim amount distribution using many techniques.

A second input of interest to the actuary is the evolution of the surplus of the insurance company over many periods of time. In *ruin theory*, the main quantity of interest is the probability that the surplus becomes negative, in which case technical ruin of the insurance company occurs. Function `ruin` of **actuar** computes ruin probabilities in the Cramér–Lundberg and Sparre Anderson models.

But for a few changes in terminology, the type of problems tackled by actuaries in insurance are very similar to risk measure problems in Finance or Hydrology, for example. Therefore, the talk may be of interest to a broad audience working with compound models and failure processes.