EXAM C QUESTIONS OF THE WEEK

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Week of September 11/06

The aggregate loss in one week, S, follows a compound negative binomial distribution, and the severity distribution is exponential. Limited fluctuation credibility is being applied to S so that the full credulity standard is to be within 5% of expected aggregate losses 95% of the time. It is found that the expected number of claims needed for full credibility is 5,412 .

Suppose that the frequency distribution is modified (but still negative binomial) so that mean and variance of the frequency both increase by 20%. Find the full credibility standard for the number of claims needed for the new compound negative binomial distribution (severity is the same exponential distribution as before).

Solution can be found below.

Week of September 11/06 - Solution

We will denote the frequency by N and the severity will be Y.

The full credibility standard for the expected number of claims needed is

$$1082.41 \cdot \frac{Var[N] \cdot (E[Y])^2 + E[N] \cdot Var[Y]}{E[N] \cdot (E[Y])^2} = 5412.05 \ .$$

Since the severity is exponential, we have $E[Y] = \theta$ and $Var[Y] = \theta^2 = (E[Y])^2$.

The full credibility standard for expected number of claims needed becomes

$1082.41 \cdot \frac{Var[N] + E[N]}{E[N]}$. Since both the mean and variance of N are increasing by 20%,

this full credibility standard is unchanged at 5412.