

EXAM C QUESTIONS OF THE WEEK

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Week of October 2/06

A loss distribution is being analyzed using the Bayesian credibility approach.

The parameter λ has a prior gamma distribution with $\alpha = 3$ and $\theta = 12$.

The model distribution X is Poisson with a mean of λ .

A sample of 6 observations of X results in a Bayesian premium of 37.48.

A 7th observation of X is obtained and the Bayesian premium is recalculated to be 37.84.

Find the value of the 7th observation.

Solution can be found below.

Week of October 2/06 - Solution

The original Bayesian premium is $(\alpha + \sum_{i=1}^6 x_i) \left(\frac{\theta}{1+6\theta} \right) = (3 + \sum_{i=1}^6 x_i) \left(\frac{12}{73} \right) = 37.48$

from which it follows that $\sum_{i=1}^6 x_i = 225$.

The updated Bayesian premium is $(\alpha + \sum_{i=1}^7 x_i) \left(\frac{\theta}{1+7\theta} \right) = (3 + \sum_{i=1}^7 x_i) \left(\frac{12}{85} \right) = 37.84$

from which it follows that $\sum_{i=1}^7 x_i = 265$.

Therefore, $x_7 = \sum_{i=1}^7 x_i - \sum_{i=1}^6 x_i = 40$.