

Bayesian Statistics in Actuarial Science

with Emphasis on Credibility

The debate between the proponents of "classical" and "Bayesian" statistical methods continues unabated. It is not the purpose of the text to resolve those issues but rather to demonstrate that within the realm of actuarial science there are a number of problems that are particularly suited for Bayesian analysis. This has been apparent to actuaries for a long time, but the lack of adequate computing power and appropriate algorithms had led to the use of various approximations. The two greatest advantages to the actuary of the Bayesian approach are that the method is independent of the model and that interval estimates are as easy to obtain as point estimates. The former attribute means that once one learns how to analyze one problem, the solution to similar, but more complex, problems will be no more difficult. The second one takes on added significance as the actuary of today is expected to provide evidence concerning the quality of any estimates. While the examples are all actuarial in nature, the methods discussed are applicable to any structured estimation problem. In particular, statisticians will recognize that the basic credibility problem has the same setting as the random effects model from analysis of variance.

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