

## Frequentist vs. Bayesian Confidence Intervals for a Probability

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Two-sided confidence intervals for the parameter  $p$  of a Binomial distribution under a prescribed confidence level are an elementary tool of statistical data analysis. The two basic quality characteristics of a confidence interval are whether the actual coverage probability exceeds a prescribed level  $\gamma$  and its length.

In this seminar I present a scheme to obtain minimum volume confidence intervals for a probability  $p$  that maintain a confidence level  $\gamma$  and allow exploiting prior information on the parameter  $p$ . The approach is a frequentist approach and prior information is expressed by a beta distribution. I compare the frequentist scheme with the Bayesian HPD credibility intervals by imposing a beta prior and analyse the performance of the intervals in terms of coverage probability and length. Useful applications in the case when prior information on the probability  $p$  is available, e. g. when  $p$  is known to be very small like in the context of audit sampling, credit risk or quality control.