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BAYESIAN INFERENCE: AN EXPOSITORY SESSION

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APPLICATION OF BAYESIAN INFERENCE
(Abstract)

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Frequently the distribution of observations $\underline{y}$ depends not only upon a set of parameters $\underline{\xi}_1$ of interest, but also on a set of nuisance parameters $\underline{\xi}_2$. In judging the sensitivity of inference about the parameters of interest relative to assumptions about the model such as normality and independence, the nuisance parameters can be measures of departure from normality and independence. From a Bayesian point of view, the posterior distribution $p(\underline{\xi}_1 | \underline{\xi}_2 = \underline{\xi}_{2o}, \underline{y})$ indicates the nature of inference about $\underline{\xi}_1$ if the corresponding assumptions $\underline{\xi}_2 = \underline{\xi}_{2o}$ about the model are made, while the posterior density $p(\underline{\xi}_2 = \underline{\xi}_{2o} | \underline{y})$ reflects the plausibility of such assumptions. The marginal posterior distribution of $\underline{\xi}_1$ obtained by integrating out $\underline{\xi}_2$,

$$p(\underline{\xi}_1 | \underline{y}) = \int_R p(\underline{\xi}_1 | \underline{\xi}_2, \underline{y})\ p(\underline{\xi}_2 | \underline{y})\ d\underline{\xi}_2, \text{ thus}$$

indicate the overall inference about $\underline{\xi}_1$ when proper consideration is given to the various possible assumptions. This approach is illustrated in detail by two examples; one concerns the comparison of two variances where the parent distributions are assumed to be members of a class of non-normal distributions, the other concerns making inferences about the coefficients in a regression model where the disturbances are autocorrelated.