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Bayesian r-priors: fixing the problems inherent in traditional best fit techniques

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A primary goal of data analysis is to determine what mathematical model can best describe how the data came about. Often, however, there are competing explanations in the form of different parametrisations, so that *model comparison* becomes necessary.

Within the Bayesian framework, model comparison is effected by means of the *evidence* and the *posterior odds* as well as information criteria inspired by information theory. These quantities are used to compare hypotheses to find the one closest to the physical model.

Starting from the usual minimum-chisquared fitting of data by linear models, we show how the evidence is calculated and why chisquared is an inadequate criterion. This leads us to introduce so-called *r-priors* which generalise the Zellner-Siow priors and Liang's g-prior to explicit spherically symmetric space.

We show by example how r-priors compare to, and improve on, both the traditional chisquared method and the older Bayesian methods.

Apply to be considered for a student award (Yes / No)?

No

Level for award (Hons, MSc, PhD, N/A)?

MSc

Main supervisor (name and email) and his / her institution

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

No

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