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Systematic model construction by squared series expansions

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In data analysis it is often difficult to understand which parameters in a model are relevant and which are not. The number of parameters must also be optimised in a systematic way.

In the Bayesian framework, the optimal set of parameters is determined by maximising the model evidence (eg via the Savage-Dickey density ratio), which is made up of a likelihood and a prior probability.

Commonly encountered orthogonal series expansions are, however, necessarily oscillatory and hence cannot describe positive definite likelihood probabilities. Expanding square roots of the likelihood permits us to achieve positivity. The argument for using square roots is reinforced by the constraints to the model by the Savage-Dickey density ratio and the Jeffreys prior.

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

Yes

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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