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Automating Transdimensional MCMC

Only a small fraction of people who use Bayesian methods actually write their own code to draw samples from the posterior distribution. The rest either get someone else to do it, or use black-box software such as WinBUGS. Accordingly the limits of such software in performing complex analysis will directly affect the utility of Bayesian methods in the natural sciences and beyond.

One current restriction in the types of analysis that may be performed is that generic sampling methods for multi-model posteriors are difficult to automate. For example, the reversible jump algorithm requires specification of a function to map between parameter spaces, which may only be efficiently specified in circumstances when the parameter spaces are geometrically visualised with ease.

In this talk I will review current methods and present work-in-progress which aim to automate moves between models in an MCMC setting. This is based on a novel density estimator that permits estimation of marginal densities. A number of examples will be presented.

(Joint work with Yanan Fan (UNSW) and Gareth Peters (UNSW))