

SIMPLE METHODS TO IMPROVE MCMC EFFICIENCY IN RANDOM EFFECT MODELS

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MCMC methods have continued to grow in popularity as their flexibility in terms of the vast number of models they can fit is realised. The family of MCMC algorithms is large and many applied researchers exposure to MCMC methods is through their use of the default estimation methods provided in software packages such as WinBUGS or MLwiN. Although these packages often try to optimize the steps of the algorithm they use to fit particular models they can still produce algorithms that result in poorly mixing chains. Many statistical methodologists produce model specific methods to improve mixing and create efficient MCMC algorithms, but for this methodology to impact on the applied community it needs to be implemented in available software. One particular way to improve the efficiency of an MCMC algorithm is through model re-parameterisation. Some reparameterisation methods can be easily implemented by modifications to the model code input into WinBUGS or via some forthcoming developments in MLwiN.

In this talk we describe briefly three such reparameterisation techniques, hierarchical centering (Gelfand et al. 1995), parameter expansion (Liu et al. 1998) and orthogonalisation of the fixed predictors (Browne et al. submitted) which can be easily implemented in WinBUGS. We will show how these methods perform on a selection of random effect models applied to examples from ecology, veterinary epidemiology and demography.