



Warwick Centre for Predictive Modelling Seminar Series

Differential Geometric MCMC Methods

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LIB1, Lower Level, Main Library

Abstract: Monte Carlo methods are the dominant approach to perform inference over increasingly sophisticated statistical models used to describe complex phenomena. This presents a major challenge as issues surrounding correct and efficient MCMC -based statistical inference over such models are of growing importance. This talk will argue that differential geometry provides the tools required to develop MCMC sampling methods suitable for challenging statistical models. By defining appropriate Riemannian metric tensors and corresponding Levi-Civita manifold connections MCMC methods based on Langevin diffusions across the model manifold are developed. Furthermore proposal mechanisms which follow geodesic flows across the manifold will be presented. The optimality of these methods in terms of mixing time shall be discussed and the strengths (and weaknesses) of such methods will be experimentally assessed on a range of statistical models will also be considered. This talk is based on work that was presented as a Discussion Paper to the Royal Statistical Society and it remains the most downloaded article from the journal website [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1467-9868/homepage/MostAccessed.html](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1467-9868/homepage/MostAccessed.html)

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