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Title: Gaussian processes in hybrid MCMC

Abstract: Extensions are made to the use of Gaussian process approximations in hybrid MCMC proposed by Rasmussen (2003), with Parallel Tempering for a multi-modal distribution.

Hybrid MCMC allows less calls to a computationally expensive posterior distribution with a Gaussian process fit for approximate derivatives.

Bayesian calibration of a rainfall runoff computer model is considered and how the same principles can lead to more efficient optimisation by Simulated Annealing.