

Bayesian uncertainty quantification of a Gaussian process in analysis of a computer experiment

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Gaussian Process (GP) statistical models are commonly used in the analysis of data from deterministic computer experiments. One advantage of the GP approach is that it gives a measure of prediction uncertainty. It is well known that uncertainty may be under-estimated when some of the parameters of the GP are replaced by plug-in, maximum-likelihood estimates. It is also widely viewed that a fully Bayesian approach can in principle account for the missing uncertainty. But can Bayes' Theorem really provide valid inference? This talk argues that the answer is sometimes no. Furthermore, even when the answer is yes, the interpretation might not be what the experimenter had in mind for his/her particular experiment. It is a joint work with Hao (Nelson) Chen, Jason Loepky, and Jerry Sacks