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Uncertainty Quantification Using Deep Gaussian Processes and Variational Bayesian inference

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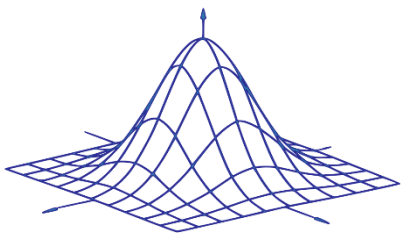
D202 Seminar room, School of Engineering, 2nd Floor

Abstract: A novel approach for uncertainty quantification and propagation in complex multiscale physical models using a newly developed non-linear Gaussian process model, known as deep Gaussian processes (deep GPs) is presented. Deep GPs are a deep belief network based on Gaussian process mappings which are suitable for deep learning and modelling of high-dimensional complex systems consisting of several hidden layers connected with non-linear mappings. The probabilistic nature of deep GPs guards against overfitting which make them more attractive deep learning models. This can be achieved by analytically approximating the marginal likelihood of the model output given input using Bayesian variational methods. This marginal likelihood can be used to automatically selecting the dimensionality of each layer and subspace to avoid any overfitting. Deep GPs are typically applied to relatively large data sets, but they can also be used for the application of deep models in the presence of the limited data.

More info: http://www2.warwick.ac.uk/fac/sci/wcpm/seminars



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