Model Validation: Some Approaches to Assessing Models with Experimental Data

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Validation experiments are experiments specifically designed to assess the predictive capability of a model. They differ from traditional experiments which are usually conducted to explore a poorly understood physical phenomena or to assess system performance. A key component of a validation experiment is the careful characterization of all required model inputs as well as their uncertainties. When these input uncertainties are propagated through a model, the resulting output is no longer a single number, but instead a nondeterministic outcome, usually a probability distribution. The subject of validation metrics addresses techniques for comparing these nondeterministic model outcomes to the experimentally measured values (and their uncertainties) and is currently an active area of research. This talk will discuss a number of approaches to validation, some of which focus on estimating model form uncertainty and others which focus more on model calibration. The question of how to infer model accuracy for conditions where no validation data are available will also be introduced.