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INSTITUTO TECNOLÓGICO AUTÓNOMO DE MÉXICO

Seminario Aleatorio

Sesión 356

Dealing with Measurement Uncertainties as Nuisance Parameters in Bayesian Model Calibration

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Abstract

In the presence of model discrepancy, the calibration of physics-based models for physical parameter inference is a challenging problem. Lack of identifiability between calibration parameters and model discrepancy requires additional identifiability constraints to be placed on the model discrepancy to obtain unique physical parameter estimates. If these assumptions are violated, the inference for the calibration parameters can be systematically biased. In many applications, such as in dynamic material property experiments, many of the calibration inputs refer to measurement uncertainties.

In this setting, we develop a metric for identifying overfitting of these measurement uncertainties, propose a prior capable of reducing this overfitting and show how this leads to a diagnostic tool for validation of physical parameter inference. The approach is demonstrated with a benchmark example, and applied to a material property application to perform inference on the equation of state parameters of tantalum.

Keywords: Model calibration, regularization, moment penalization, measurement uncertainty

*This work is joint with Kellin Rumsey and part of his Ph.D dissertation at the University of New Mexico. SAND2020-6662J.
Read More: https://epubs.siam.org/doi/abs/10.1137/19M1283707

Viernes 23 de octubre de 2020, 13:00 hrs. Hora de CDMX

https://itam.zoom.us/j/96701260686?pwd=NTJBcUl3QVU0TzB6SHlHVTY2QXA0Zz09
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