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Mathematics Institute of Computational Science and Engineering - MATHICSE

SEMINAR OF NUMERICAL ANALYSIS

➤ **TUESDAY 2 JUNE 2015 - ROOM GRC 001 - 14h15**

Prof. Robert MOSER, (Inst. for Computational Engineering and Sciences and Dept. of Mechanical Engineering, University of Texas at Austin, USA) will present a seminar entitled:

"Validating Computational Predictions of Unobserved Quantities"

Abstract:

One of the most challenging and important applications of computational models of physical systems is to make predictions when no observations of the quantities being predicted are available. This is the usual situation when model results are to be used to support decisions (e.g. design or operations decisions) where predictions are needed precisely because observational data are not available when the decision must be made. Predictions, then, are essentially extrapolations of available information to the quantities and scenarios of interest. The validation challenge is to assess whether such an extrapolation can be made reliably. Computational models of physical systems are typically based on a reliable theoretical foundation (e.g. conservation laws) composed with various more-or-less reliable embedded models (e.g. constitutive relations). This composite model structure can enable reliable predictions provided the less reliable embedded models are used within the domain in which they have been tested. In this case, a reliable extrapolation is possible through the reliable theory, whose validity in the context of the prediction is not in doubt. In this lecture, we will explore techniques for assessing the validity of predictions in the context of this composite model structure.

One of the challenges of assessing the validity of model predictions is characterizing the effects of model errors on the reliability of the predictions. The prediction process advocated here requires that representations be introduced for the uncertainty due to errors in embedded models. Progress on developing such representations in two example applications will also be presented.

Robert Moser & Todd Oliver

Lausanne, 19 May 2015/FN/cr