

*Prof. Alfio Quarteroni*

*Mathematics Institute of Computational Science and Engineering - MATHICSE*

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***SEMINAR OF NUMERICAL ANALYSIS***

➤ **WEDNESDAY 16 OCTOBER 2013 - 4.15 pm, ROOM GR A3 30**

**Dr. Masayuki YANO**, (*Massachusetts Institute of Technology, Cambridge/USA*) will present a seminar entitled:

***"A model-data variational formulation: rapid and reliable in-painting for partial differential equations"***

Abstract:

We present the model-data variational formulation, an integrated variational framework which combines a "model" (partial differential equation) and "data" (M experimental observations) to yield estimates for state and model bias. We first abstract the estimation problem as a variational problem in the presence of unlimited observations. We then consider an approximate solution of the variational problem based on experimentally-realizable limited observations; we provide an associated a priori theory which identifies distinct contributions to reduction in the state error with the number of observations. We then incorporate certified reduced basis method into the model-data variational formulation. We in particular develop an efficient offline-online computational strategy in the reduced basis setting in which we invoke real data in real-time. We finally apply the method to a synthetic two-dimensional Helmholtz problem and real-data associated with a (three-dimensional) acoustic resonator to assess the effectiveness of the proposed method.

(This is work in collaboration with Prof. Anthony Patera and Dr. James Penn.)

Lausanne, 17 September 2013/AQ/cr

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The seminars taking place at the Section of Mathematics are announced on internet address : [www  
http://mathicse.epfl.ch/seminars](http://mathicse.epfl.ch/seminars)