

CHORUS: Common Horizon of open research on Uncertainty in Simulations

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Workshop Kriging and Gaussian processes for computer
experiments, IHP Paris - 30/04/2014

Partners

Motivation

Objectives

Description of the project

Program of the day

Partners



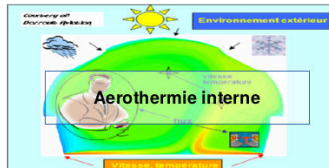
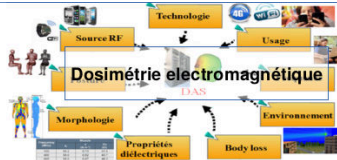
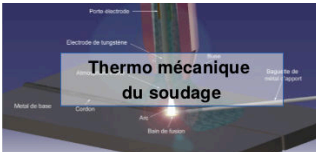
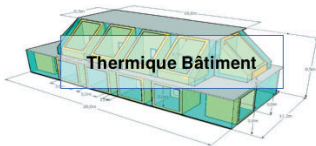
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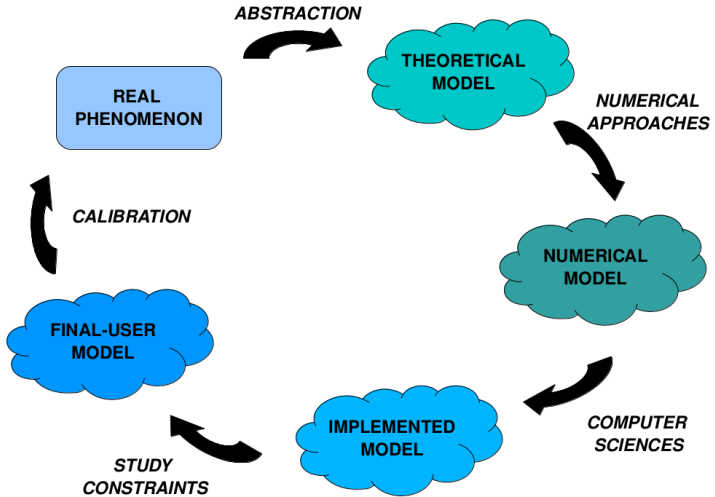


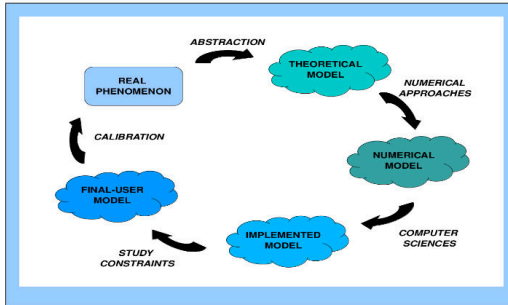
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Use-cases







To understand in details
a phenomenon

To optimize
a cost function

To be used in a
coupled resolution

To estimate the
quality of a simulation

Objectives of the project

- **On the scientific side**, CHORUS aims at fostering the research from several communities from numerical analysis, statistical learning, and uncertainty analysis to face the scalability problems encountered in practice.
- **On the software side**, the CHORUS platform aims at facilitating the increase of maturity of many individual bricks coming from the labs by recommending or developing interoperable links with other tools. Open Source is the strategy of CHORUS.
- **On the applicative side**, CHORUS aims at delivering methods and tools to external user-groups and communities during its implementation, even before the end of the project.

Scientific developments (1/3)

Content

1 Methodological contributions :

- integration of the metamodel goal in the building phase
- integrating intrusive or non-intrusive meta model during an uncertainty analysis study
- enlightening the use of adaptive designs and multi-fidelity models inside the numerical processes
- generic formalization of the calibration/validation process
- formalization of multi disciplinary activities taking into account uncertainty

2 Algorithmic contributions :

3 HPC contributions :

Scientific developments (2/3)

Content

- 1 **Methodological contributions :**
- 2 **Algorithmic contributions :**
 - Complexity reduction using structured approximations for non intrusive metamodelling
 - Weakly intrusive and goal-oriented model reduction for parametrized PDEs
 - Goal-oriented sampling and multi-fidelity models
 - Advanced demonstrations planned at the end of the project
- 3 **HPC contributions :**

Scientific developments (3/3)

Content

- 1 **Methodological contributions :**
- 2 **Algorithmic contributions :**
- 3 **HPC contributions :**
 - Open platform and Distributed computing
 - Non-intrusive Meta-Modelling by HPC
 - Certified reduced basis by HPC
 - Towards automation of embedded analysis capabilities in multi-physics simulations

Software developments

Content



FEEL++



Content

- 1 Virtual Quality Lab :
- 2 Advanced developments

Program of the day

- 10 :00 - 10 :45 : Sur quelques aspects de la mise en oeuvre de la géostatistique en géosciences (C. de Fouquet)
- 10 :45 - 11 :00 : Coffee Break
- 11 :00 - 11 :45 : Adaptive numerical design for calibration of a computer model (P. Barbillon)
- 11 :45 - 12 :30 : Cokriging for multi-fidelity codes (L. Le Gratiet)
- 12 :30 - 14 :00 : Lunch break
- 14 :00 - 14 :45 : Simulation rapide de champs Gaussiens conditionnels dans un cadre séquentiel (C. Chevalier)
- 14 :45 - 15 :30 : Version propagative de Gibbs (C. Lantuéjoul)
- 15 :30 - 15 :45 : Coffee Break
- 15 :45 - 16 :30 : Gaussian process modeling with inequality constraints : adaptive strategies (S. da Veiga)