OPUS

Open source Platform for Uncertainty treatment in Simulation

ON GOING PROJECT

The goal of OPUS project is to create and sustain an activity about generic uncertainty treatment by properly structuring, within an integrated open-source platform, prototype software contributions and applied research works.

The OPUS developments main keywords are:

▶ Genericity: they are designed to comply with a large set of industrial problems.

▶ User friendliness: they are designed for engineering purposes.

▶ High Performance: they are designed to cope with complex systems simulators.

▶ Advanced methods: they will provide to users innovative R&D methods.

▶ Open Source: the best way for sharing and improving them.

▶ Interoperability: they aim to work with any computer code.

▶ Durable: they are designed together with a durable business model.

TECHNOLOGICAL OR SCIENTIFIC INNOVATIONS

The OPUS project approach is based on a "loop" that starts from real industrial use-cases, arising from different business areas (energy production, nuclear safety, aerospace). The complex mathematical and numerical treatments to be performed within these use-cases let rise the need for advanced methods, coming from academic and scientific research. Once these methods developed and tested, they are integrated and perpetuated inside the reference software platform, to be reused in other similar industrial studies.

The advanced methods studied within the OPUS project cover a wide set of problems both industrial and scientific: the use of "meta-models" to replace time-consuming computer codes, the sensitivity analysis of uncertainty sources, the statistical modeling of variables that can not be directly observed, the coupling of multi-physics and multi-scale computational codes, the estimation of very rare quantiles, corresponding to low probability events, and robust real-time implementation of partial derivatives differential equations.
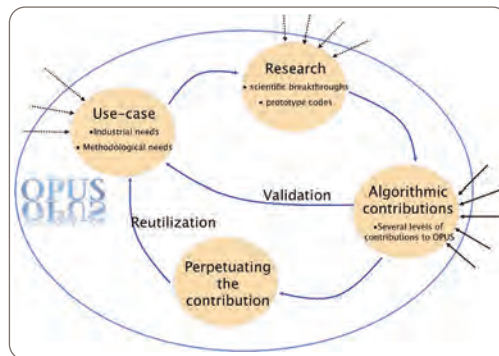
STATUS - MAIN PROJECT OUTCOMES

▶ The Second Annual Review has been held in April 2010.

▶ Three workshops have been held about the following topics: uncertainty analysis and quantification, statistical learning and model selection, spectral methods and polynomial chaos.

▶ Prototype codes have been applied to the use-cases provided by industrial partners.

▶ Different levels of contribution to the OPUS "platform" have been specified, depending on the integration level within the reference software platform (Open TURNS).

CONTACT

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PROJECT DATA

Coordinator:
EDF-R&D

Call:
ANR

Start date:
April 2008

Duration:
36 months

Global budget (M€):
2.2

Funding (M€):
1

Related Systematic project(s):
EHPOC, CSDL