PERSALYS, the graphical interface of OpenTURNS

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November 8th 2024, Persalys User's day

Contents

Bring Uncertainty Methodology to Engineers

▶ Partnership started in 2015
  ▶ EDF R&D wanted its engineer and researcher teams to use uncertainty methodology through the use of OpenTURNS (from an existing GUI)
    $\rightarrow$ develop a GUI to make it more user-friendly
  ▶ Phimeca had already developed PhimecaSoft® which satisfied some needs of EDF R&D but not all.
  ▶ EDF R&D and Phimeca decided to start a specific partnership in order to develop a new, open source GUI based on OpenTURNS

Some expectations regarding the GUI

- As easy to use as possible and, when it is possible, a GUI which can guide the user
- Possibility to use it inside Salome Platform to
  - Use High Performance Computing (HPC) resources
  - Connect to EDF numerical code users (Code_Aster for example)
- Take benefit from the advanced visualization capability from Paraview
- Drive the GUI from a python script usable in an "expert" mode
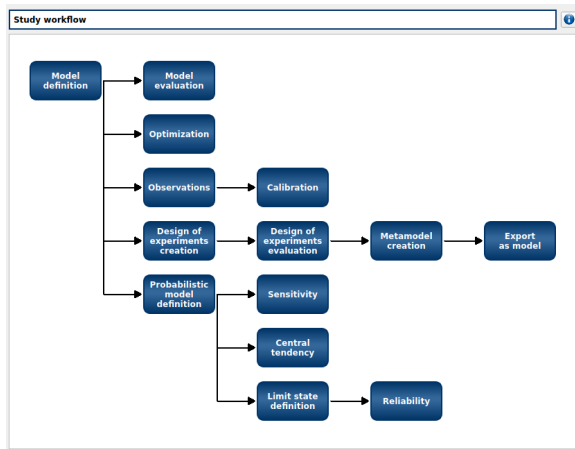
PERSALYS, the graphical user interface of OpenTURNS

- ▶ Main goal : provide a graphical interface of OpenTURNS in the SALOME integration platform
- ▶ Generic (not dedicated to a specific application)
  Allows data analysis
  Allows for a wide variety of models
  Can be coupled to external code
  Locally parallel
- ▶ GUI language : English, French

Features

- ▶ Data analysis   doc Persalys
- ▶ Distribution fitting (including copulas)
- ▶ Physical model with vector input and vector output or 1D Fields   doc Persalys
- ▶ Probabilistic model definition (including dependence)   doc Persalys
- ▶ Design of experiments (deterministic and probabilistic)   doc Persalys
- ▶ Central tendency, sensitivity and threshold exceedance analysis   doc Persalys
- ▶ Metamodeling (linear regression, polynomial chaos, kriging)   doc Persalys
- ▶ Screening (Morris) using otmorris module   doc Persalys
- ▶ Optimization (mono/multi-objective)   doc Persalys
- ▶ Calibration (least-squares, Bayesian)   doc Persalys

Features - Physical model

Vector function

- ▶ Symbolic model : simple analytical function
- ▶ Python model : create a complex function, using external module
- ▶ FMI model : import a system model using FMU file
- ▶ Coupling model : generic interface to link Persalys to an external code
- ▶ Metamodel : model created inside Persalys from an existing metamodel

Field function : outputs are 1-D fields

- ▶ Symbolic or Python model
- ▶ Mesh : either a regular grid created inside Persalys or imported from a file

Community

- ▶ Users' day!
- ▶ Support support@persalys.fr
- ▶ Website `https://persalys.fr/?la=en`
- ▶ Forum `https://persalys.discourse.group`
- ▶ Commercialization by Phimeca consists in :
  - ▶ Providing training, support on projects
  - ▶ Developing customized versions (EDF, NavalGroup) or specific features (Thales, NavalGroup), cheaper than dedicated software

	Level 1	Level 2	Level 3
Content	Provision of the source code and Windows or Linux executables, on request via the mail form. A new version is available at least once a year or when a major update is released. Persalys is also integrated into SALOME platform. You can download it from the SALOME website.	Purchase a 1-year support with access to the updates (minor version, bug fix). This level is a package of 1800€, excluding taxes. It includes 15h of assistance, divided according to your needs: • Training (max. 1 day, for 2 users max.) • Support on projects In need of more support? We provide a customised quotation.	Customised development in the interface: • Custom physical model • Integration of specific methods • Feel free to contact us to get a customised quotation depending on your need.
Subscription	Free	1800 € excl. tax	Customised quotation

Community - we need you

▶ Users' feedback, showcases, knowledge
   sharing
   → Contact mail
   → Forum
   https://persalys.discourse.group

▶ Bug reports
   → Open tickets on GitHub
   https://github.com/persalys/
   persalys/issues

▶ Help us communicate and expend our
   growing community
   → Send us your videos!

Summary

- ▶ Partners : EDF, Phimeca
- ▶ Licence : LGPL
- ▶ Schedule : new release twice a year
- ▶ Availability :
  - ▶ Stand-alone version : for free on demand on www.persalys.fr
  - ▶ SALOME_EDF in the "CONTRIBUTIONS" section since 2018 on https://www.salome-platform.org
  - ▶ Debian stable "bookworm" and testing "trixie" https://packages.debian.org/source/bookworm/persalys We thank Pierre Gruet (EDF) for this outstanding work!

What's new in 2024

- ▶ Persalys 16.1 released in July
  - ▶ YACS DoE evaluations can now be detached
  - ▶ Optimisation overhaul
  - ▶ Added nopip module for Python modules installation
  - ▶ Automatic detection for observations variables
  - ▶ Added openpyxl support to import Excel files in Python model

- ▶ Persalys 17 released in October
  - ▶ Parallelization setting : global and a specific Python/Coupling/FMI/YACS models properties
  - ▶ Various fix : FMI model parallelization, histograms bandwidth, calibration result plots legends
  - ▶ New support for Python 3.12 and ParaView 5.12

The end

Thanks !

Questions ?