Numerical simulations of fast dynamic phenomena with Europlexus in EDF R&D

Leonard Antoinat – Guillaume Drouet
Research engineers at EDF Paris-Saclay
PSM - Project
FAST - Project

JUSM 2019
SALOME_MECA?
Leverages the existing SALOME platform

Relies on powerful existing solvers

Brings everything together in dedicated skill modules
salome_meca: a platform for sharing know-how...

Fissuration des culasses des moteurs diesel de secours du parc 900MWe

Comportement au séisme des râteliers de stockage de combustible

Comportement des enceintes de confinement des réacteurs nucléaires

Maîtrise du risque de fracturation de la zone Haute Activité de CIGEO

Propagation de fissure dans les briques de graphite des réacteurs

Calcul au séisme des barrages en béton
PI : ANALYSIS OF FAST TRANSIENTS IN FLEXIBLE PIPING
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Example of the 3D view of a pipeline constructed within Pi

Pi is the first tool in Salome Meca 2019 specialized in the analysis of transients occurring in piping such as water hammer, rupture, and whip.

Basic UX design
Pi – Pre-processing module / user input
Pi - Calculation management and follow-up
Pi – Post-processing module / field plot
A SALOME BASED TOOL
Pi uses all the capacities of GEOM, SMESH and Paravis modules
A SALOME BASED TOOL

- **Python - PyQt development**
  - Layout generated by Qt designer
  - Easy to develop approach
  - A scriptable data model

- Some applications:
  - Dialogs automatic generation
  - Contextual help
  - Automatic save
A SALOME BASED TOOL

- Modular approach - Multi - solver

Pipe Med model  
Pi script  
Hdf format

Import to Pi data model

Mesh generation

Europlexus text file generation

Smesh  
Jinja 2

Calculation launch and post processing
A SALOME BASED TOOL

- Modular approach - Multi - solver

Pipe Med model
Pi script
Hdf format

Import to Pi data model

Mesh generation
Smesh
Jinja 2

Code aster text file generation

Calculation launch and post processing

Displacement (m)
- 7.89e+00
- 6.9165
- 3.943
- 1.9722
- 0.000e+00
A SALOME BASED TOOL

- Modular approach - Multi solver

3D CAD model → Import to Pi data model → Calculation launch and post processing

- Mesh generation
- Europlexus text file generation

EDF
Pi is the first tool in Salome Meca 2019 specialized in the analysis of transients occurring in piping such as water hammer, rupture, and whip.

Pi is only possible thanks to SALOME components

Pi uses geom, smesh and Paravis capacities

Pi is developed in Python Pyqt language

Pi is modular: multi-physics and multi-solver, and is easily extendable
THANK YOU