HPC & Uncertainty Treatment Examples with OpenTURNS and Uranie

Partnership for Advanced Computing in Europe

Open TURNS Consortium

(EDF – Airbus group – Phimeca - IMACS)

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CEA

MAISON DE LA SIMULATION

May 16-18, 2018 – Maison de la Simulation, France

HPC and Uncertainty Treatment - Examples with OpenTURNS and Uranie

Partnership for Advanced Computing in Europe (PRACE)

OpenTURNS Consortium (EDF – Airbus Group Innovation – Phimeca - IMACS) and CEA

16-18 may 2018, 9h30- 12h30 / 14h – 17h, Maison de la Simulation, France

Day 1 : Methodology of Uncertainty Treatment – Basics of Probability and Statistics

- Training presentation - General Uncertainty methodology - Presentation of the case study (30') : EDF (A. Dutfoy)
- Probability and statistics: Basics (1h30) : Phimeca (M. Marcilhac)
- General introduction to Open TURNS and Uranie : (2*20') : Phimeca (M. Marcilhac)– CEA (JB Blanchard)

Lunch

- Uncertainty Quantification (1h) : CEA (F. Gaudier)
- Application to OpenTURNS and Uranie: distribution fitting for the variable E (1h): Phimeca (M. Marcilhac), CEA (F. Gaudier)
- Central tendency and Sensitivity analysis (1h): EDF (G. Chastaing)

Day 2 : Quantification, Propagation and Ranking of Uncertainties

- Application to OpenTURNS and Uranie (2h): EDF (Th. Delage) – Phimeca (A. Dumas)- CEA (F. Gaudier/JB Blanchard) – IMACS (S. Haddad)
- Estimation of probability of rare events (1h): Phimeca (A. Dumas)

Lunch

- Application to OpenTURNS and Uranie (2h): EDF (Th. Delage) – Phimeca (A. Dumas)- CEA (F. Gaudier/JB Blanchard) – IMACS (S. Haddad)
- Presentation of an industrial case: Phimeca (A. Dumas) (1h)

Day 3 : HPC aspects – Meta model

- Distributed computing (1h30) :
  - Uranie (30') : CEA (F. Gaudier).
  - Open TURNS (30'): Phimeca (A. Dumas)
  - Open TURNS and Salome : clusters and example (30') : EDF (O. Mircescu)
- Meta model – Focus on the polynomial chaos expansion (1h30) : EDF (C. Mai - A. Dumas)

Lunch

- Application to OpenTURNS and Uranie (1h) : EDF (C. Mai) - Phimeca (A. Dumas) - CEA (F. Gaudier/ JB Blanchard).
- HPC aspects specific to the Uncertainty treatment (1h) : IMACS (Kieran Delamotte)