OpenTURNS Developer training: first steps

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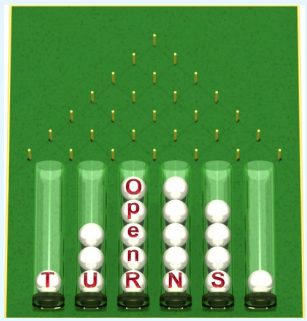
Developers training



OpenTURNS: first steps

Navigation in the source code

The Uniform distribution

- Locate the class within the library source code;
- Follow its inheritance graph in order to explore the Bridge pattern;
- Locate the associated regression test;
- Execute the test;
- Locate its SWIG interface file and its associated Python module;
- Execute the associated python test.

Library development 1/2

Projects

1. Weighted interpolation: create a new NumericalMathEvaluation that interpolate between points of a NumericalSample using weighted kernel interpolation.

$$f(\underline{x}) = \alpha \sum_{i=0}^{N-1} K(\underline{x} - \underline{X}^i)\underline{Y}^i \tag{1}$$

   where K is a given Distribution and α is a normalization factor.
2. CloudMesher: mesh generation over a cloud of points using kernel mixture, pca, rotation, then levelset mesher on an interval
3. ClenshawCurtis 1-d integration: https://people.maths.ox.ac.uk/trefethen/cctalk.pdf + ClenshawCurtisProductExperiment
4. TawnCopula/JoeCopula/MaxCopula 2-d copulas

Library development 2/2

Projects

5. Extend archimedian copulas from 2-d to *n*-d (FarlieGumbelMorgenstern, FrankCopula, ClaytonCopula, AliMikhailHaqCopula)
6. ArchiMaxCopula, see ExtremeValueCopula
7. Extend ComposedDistribution to accept a list of n-d distributions
8. Add a method to SobolSimulationAlgorithm to draw sobol indices (openturns/issues/1001)

Module development

Projects

1. Convert the IntegralCompoundPoisson distribution python module into an OpenTURNS C++ module
2. Create a RandomVector distributed uniformly over an n dimensional sphere/ball/simplex;