Tutorial Instructions ENGG406

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1 Introduction

The function used in the tutorial is the Ishigami function given as:

$$f(X) = sin(X_1) + asin^2(X_2) + bX_3^4 sin(X_1)$$

The uncertain parameters of the $f(X)$ is given in Table 1 and the fixed parameters $a = 7$ and $b = 0.1$.

Variable	Distribution	θ_1	θ_2	Mean
X_1	Uniform	$-\pi$	π	$\frac{\pi+\pi}{2}$
X_2	Uniform	$-\pi$	π	$\frac{\pi+\pi}{2}$
X_3	Uniform	$-\pi$	π	$\frac{\pi+\pi}{2}$

Table 1: Random variables and their parameters

1.1 Matlab script

The m files provided for the tutorial are:

- `IshigamiModelSensitivityAnalysisENGG406.m`

- `IshigamiModelAdvancedMonteCarloENGG406.m`

- `IshigamiModelArtificialNeuralNetworkENGG406.m`

- `ishigami.m`

Each student should select one topic from Sensitivity Analysis, Advanced Monte Carlo and Artificial Neural Network and a corresponding tutorial m file. Try to understand the tutorial you select and see how you can adapt it to your problem.

1.2 Running the Matlab script

To uses these files you need to download OpenCossan from `cossan.co.uk`.

- Go to user area in the menu list and create a user account.

- Sign in with user account details.

- Download `OpenCossan.zip`.

- Unzip file.

- Start Matlab.

- In Matlab go to the folder `\OpenCossan\src\common` and initialize OpenCossan by typing `OpenCossan` in Matlab command window.

- Now you can go to the folder where you have your m files and run your analysis.

- Note: to run a particular analysis, you need to have the file that contains the analysis and the `ishigami.m` file in the same folder