1st EUROPEAN
RAVEN WORKSHOP
September 17-19, 2019
Sapienza University of Rome, Rome, Italy

RAVEN

RAVEN (https://raven.inl.gov) is a flexible and multi-purpose probabilistic risk assessment, uncertainty quantification, data analysis, and model optimization framework. Depending on the tasks to be accomplished and, in some cases, on the probabilistic characterization of the problem, RAVEN uses established methods (e.g., Monte Carlo, Latin hypercube, reliability surface search, etc.) to perturb the system to be analyzed, altering the input parameters. The system is modeled by third party software (e.g., RELAP5-3D, PHISICS, MAAP5, BISON, Modelica, etc.) and is accessible to RAVEN either directly (via software coupling) or indirectly (via input/output files). The outcomes of the sampling process are analyzed using statistical and data mining approaches. RAVEN also manages the parallel dispatching (i.e., both on desktop/workstation and large HPC systems) of the software representing the physical model. RAVEN relies on artificial intelligence algorithms to construct surrogate models of complex physical systems to accelerate the analysis. RAVEN can be employed for several types of applications, such as uncertainty quantification, sensitivity analysis, PRA, regression analysis, data mining, model optimization, and design of experiments.
An overview of the software is available at raven.inl.gov.
The software is open source and can be downloaded at:
https://github.com/idaholab/raven.

Training Objectives

The first objective is to provide a general understanding of the RAVEN package and its main capabilities. Second, a series of practical examples will be provided in ascending level of complexity, starting from the simplest statistical analysis to the generation of the complex surrogate models and their utilization in reliability analysis and uncertainty quantification. Third, the problem of the dimensionality reduction and model optimization will be covered. At the end of the training activities, attendees will be able to autonomously use the code in one or more of the RAVEN applications' areas. Each training section will be equally divided between a theoretical/code usage overview of the subject capability and hands-on activities (construction of the RAVEN input and execution of the analysis); for this reason, it is suggested that the attendees have their own laptop ready to run the proposed examples. A RAVEN team member will be available for solving unexpected problems. Attendees without laptops will get a copy of the example inputs in electronic format. Installation before the training is suggested to maximize effectiveness of the training.

SCIENTIFIC COMMITTEE

Prof. Gianfranco Caruso, Sapienza
Dr. Fabio Giannetti, Sapienza
Dr. Cristian Rabiti, INL
Dr. Andrea Alfonsi, INL
Dr. Paul Talbot, INL

REGISTRATION

Fill the form available **here**

The workshop participation is free of charge, but with limited attendance availability. It would be beneficial to register as soon as possible.

CONTACT

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VENUE

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Rome, Italy

DIPARTIMENTO
DI INGEGNERIA ASTRONAUTICA
ELETTRICA ED ENERGETICA

SAPIENZA
UNIVERSITÀ DI ROMA

iNL Idaho National Laboratory

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Day 1
September 17th
Room: TBD

09:00	RAVEN installation support (optional for who already have RAVEN installed)
10:15	RAVEN overview, software introduction
11:15	Break
11:30	RAVEN input structure and calculation flow
12:00	Forward sampling and statistical analysis (examples RELAP5-3D & MELCOR)
13:00	Lunch break
14:00	Time-dependent statistical analysis (examples RELAP5-3D & MELCOR)
15:00	Hands-on activity
16:15	Break
17:30	Hands-on activity
18:00	Adjourn

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Day 2
September 18th
Room: TBD

09:00	Code coupling
09:45	Hands-on activity
10:45	Break
11:00	Reduced order modeling (examples RELAP5-3D & MELCOR)
11:45	Hands-on activity
12:45	Lunch break
13:30	Ensemble modeling and hybrid modeling (examples RELAP5-3D)
14:30	Hands-on activity
15:30	Break
15:45	Advanced reliability analysis (examples RELAP5-3D & MELCOR)
16:30	Hands-on activity
18:00	Adjourn

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Day 3
September 19th
Room:TBD

09:00	Data mining
09:45	Time-dependent data mining (examples RELAP5-3D & MELCOR)
10:30	Break
10:45	Hands-on activity
12:45	Lunch break
13:45	RAVEN templated input system (advanced templated analysis flow)
14:45	Hands-on activity or Audience requested in-deep discussion
17:15	Adjourn