Introduction to the Workshop

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Idaho National Laboratory

Purpose and Assumptions

The Purpose of this training session is to

- Demonstrate the application of MOOSE-based tools for coupled neutronics and thermal-hydraulics modeling of liquid fuel molten salt reactors (MSRs).
- Developing a multiphysics simulation for a simplified model of the Molten Salt Reactor Experiment (MSRE).
- Coupling neutronics based on the Griffin neutronics code, and thermal hydraulics based on the Pronghorn code.
- Steady-state and a flow driven transient will be modeled with demonstration of the delayed neutron precursor impacts.

Presenters: Mustafa K. Jaradat, Mauricio Tano Retamales, Ting Fei

We assume that attendees are familiar with:

- the discretization of the linearized Boltzmann transport equation
  - Energy (multigroup approximation)
  - Space (CFEM, DFEM)
  - Angle (Discrete ordinates method, diffusion approximation)
- The MOOSE framework
- Paraview application

MSR Workshop Agenda

	Time	Topic	Presenter
1	1:00 – 1:30 pm (30 min):	Introduction to MSRE	M. Jaradat
2	1:30 – 2:00 pm (30 min):	Introduction to cross section preparation & mesh generation for MSRE	T. Fei
3	2:00 – 2:20 pm (20 min):	Steady-state Heterogeneous neutronics model of MSRE with Griffin	T. Fei
4	2:20 – 3:00 pm (40 min):	Thermal-Hydraulics model of the MSRE with Pronghorn (Exercise 1)	M. Retamales
	3:00 – 3:10 pm (10 min):	Coffee Break	
5	3:10 – 3:55 pm (45 min):	Multiphysics steady-state model of MSRE with Griffin & Pronghorn (Exercise 2)	M. Jaradat
6	3:55 – 4:40 pm (45 min):	Multiphysics transient model of MSRE with Griffin & Pronghorn (Exercise 3)	M. Jaradat
7	4:40 – 5:00 pm (20 min):	Demonstration of species transport (Griffin, Pronghorn, Thermochimica) (Exercise 4)	M. Retamales

Resources

- MOOSE framework website – https://mooseframework.inl.gov
- Griffin application website – https://griffin-docs.hpcondemand.inl.gov/
- Griffin application forum – https://griffin-discourse.hpcondemand.inl.gov
- Pronghorn application website https://pronghorn-dev.hpc.inl.gov/site/index.html

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