

Application of AI Methods in Nuclear Engineering

This lecture will demonstrate techniques for using meta-heuristic algorithms in fuel cycle optimization. Two meta-heuristic algorithms will be briefly explained with their application in nuclear engineering. The problem of cycle design, basic parameters and operational safety, objectives and requirements for design will be briefly explained. An optimization example based on generic EPR will be given and presented step by step. In addition, the generation of cross section libraries supported by machine learning will be presented.

Duration: 3h

Language: English

Participants: 10 to 30

Location: classroom



Basics

Prerequisites: None

Your profile

Master 1-2 level student in a partnering university, wishing to learn about the techniques for using meta-heuristic algorithms in fuel cycle optimization.

During the training, you will:

- Learn about the techniques for using meta-heuristic algorithms in fuel cycle optimization

After the training, you will be able to:

- Practice the techniques by using meta-heuristic algorithms in fuel cycle optimization

Advantages

- Face-to-face training
- Practical example based on generic EPR

Content

Theoretical module:

- Meta-heuristic algorithms brief explanation: genetic algorithms, particle swarm optimization, simulated annealing
- Idea of their application in nuclear engineering
- Problem of cycle design
- Basic parameters and operational safety
- Objectives and requirements for design

- Optimization example based on generic EPR presented step by step
- Generation of cross section libraries supported by machine

Practice :

- Example based on generic EPR will be given and presented step by step

Evaluation

- None