

Simulation of turbulent flow through heated rod bundles with spiral spacer wire

Master Thesis

Task description

Fast reactor rod bundle geometry with spiral spacer is typically used in liquid metal cooled reactors. The point contact between the spacer and the wire together with the spiral shape of the spacers makes the geometry complex, and increases the mixing effects. This fluid mixing in the gaps reduces the temperature differences in the coolant as well as along the perimeter of the rods. The prediction of the temperature distribution is of major importance for design and safety issues. In this M.Sc. thesis, the candidate will perform several CFD simulations using different turbulence models and computational grids.

Tasks

- Literature review, short report on it's current status (few pages)
- Creation of adequate computational grids
- Simulation of the rod bundle geometry with a low Prandtl number fluid as coolant
- Evaluation of the results and comparisons with available experimental data

Prerequisites

- Background in fluid dynamics
- Basic knowledge of heat transfer
- First experience with CFD

Start date

As soon as possible

Duration

4-6 months (depending of the scope of work)

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