

Bachelor or Master Thesis

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Validation of TRACE with respect to condensation of high-velocity steam within a pipe

The aim of this task is the post-test analysis of an experiments with the system code TRACE with respect to the validating its predicting capabilities. Local heat transfer coefficients have been measured during the condensation of high-velocity steam in a downward pipe. Performed at the Lewis Research Center in the 1960s for the NASA, the intension of this experiment was the assessment of Rankine cycles for powering space systems. To simulate zero-g conditions high velocities (up to 1000 ft/sec) have been chosen to realize a high Froude number. The experimental results are a perfect database for the validation of the system code TRACE which is usually used for the design and the demonstration of safe operation of nuclear power plants or other energy related facilities. The following points should be considered in the work

- Literature review with respect to condensation of high-velocity steam in a tube
- Conditioning of the experimental data
- Development of a TRACE model of the experimental facility/test section
- Post-test analysis of selected experimental campaigns
- Comparison of the experiment with the predictions
- Quantitative and qualitative evaluation of the results regarding its accuracy/deviation
- Recommendations with respect to applicability and improvement (if necessary) of TRACE
- Documentation and preparation of a report (thesis) of aforementioned points

Requirement: Mechanical/Process/Energy Engineering or similar Duration: 4-6 months

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