

Experimental and Numerical Analyses of Tehran Research Reactor

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Abstract : In this paper, a numerical model is presented. The model is used to analyze a steady state thermo-hydraulic and reactivity insertion transient in TRR reference cores respectively. The model predictions are compared with the experiments and PARET code results. The model uses the piecewise constant and lumped parameter methods for the coupled point kinetics and thermal-hydraulics modules respectively. The advantages of the piecewise constant method are simplicity, efficiency and accuracy. A main criterion on the applicability range of this model is that the exit coolant temperature remains below the saturation temperature, i.e. no bulk boiling occurs in the core. The calculation values of power and coolant temperature, in steady state and positive reactivity insertion scenario, are in good agreement with the experiment values. However, the model is a useful tool for the transient analysis of most research reactor encountered in practice. The main objective of this work is using simple calculation methods and benchmarking them with experimental data. This model can be used for training proposes.

Keywords : thermal-hydraulic, research reactor, reactivity insertion, numerical modeling

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