TFIT Modeling of Subcooled Boiling and Flow Excursion
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ABSTRACT
In the nuclear power industry, the Two-Fluid Model (TFM) is mainly used in the simulation of Loss of Coolant Accident (LOCA). The Two-Fluid Model is a wave mechanics formulation that may also be used to analytically perform stability analysis, which requires numerous assumptions and simplifications. This project aimed to advance the TFIT-TFM simulations in the modeling of the flow excursion instability. By using the TFIT computational code, simulation results can be obtained without the need for assumptions and simplifications. In this project, a simulation was performed to verify the nonlinear wave propagation capability of TFIT. During the verification process, the results produced by TFIT were tested for convergence by reducing the mesh size of the simulation until the dispersion of the wave was no longer affected by changes to mesh size. The verification of the 1D TFM was required before modeling the flow excursion instability. The development of flow excursion modeling within the CFD code will lead to better safety analysis of light water reactors.

KEYWORDS
Two-Phase Flow, Two-Fluid Model, Flow Excursion