Prediction of a subcooled boiling flow with advanced two-phase flow models

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Prediction of bubble size which governs interfacial transfer terms between the two phases is of importance for an accurate prediction of the subcooled boiling flow. In the present work, a mechanistic bubbles size model, S was examined to enhance the prediction capability of subcooled boiling flows for the CFD (computational fluid dynamics) code. In addition to this, advanced subcooled boiling models such as new wall boiling and two-phase logarithmic wall function models were also applied for an improvement of energy partitioning and two-phase turbulence models, respectively. The benchmark calculation against the DEBORA subcooled boiling data confirms that the S bubble size model with the two advanced subcooled boiling models shows good prediction results and is applicable to the wide range of flow conditions that are expected in the nominal and postulated accidental conditions of a nuclear power plant

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