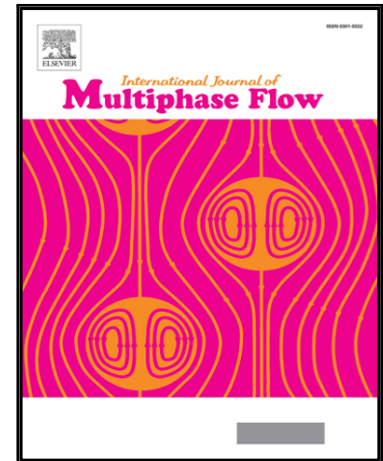


## Accepted Manuscript

Numerical Simulation of Stratified-Pattern Two-Phase Flow in Gas Pipelines Using a Two-Fluid Model

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**Highlights**

- A two-fluid model is discretized with the FCT method to simulate two-phase flows in gas pipelines.
- Hyperbolicity is lost over a range of the Taitel and Dukler's diagram for stratified-flow pattern.
- Eigenvalues alternate signs at boundaries with implications on how to impose the boundary conditions.
- Accuracy analysis is conducted to show that the FCT is up to second-order in space.
- The model is validated against numerical simulations carried out with a commercial software.

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