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Stabilized-finite-element/interface-capturing technique for parallel computation of unsteady flows with interfaces. (English) [Zbl 0994.76050](#)

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Summary: We present the stabilized-finite-element/interface-capturing (SFE/IC) method developed for parallel computation of unsteady flow problems with two-fluid interfaces and free surfaces. The SFE/IC method involves stabilized formulations, an interface-sharpening technique, and the enforcement of global mass conservation for each fluid. The SFE/IC method has been efficiently implemented on the CRAY T3E parallel supercomputer. A number of two-dimensional test problems are presented to demonstrate how the SFE/IC method works and the accuracy it attains. We also show how the SFE/IC method can be effectively applied to three-dimensional simulations of challenging flow problems, such as two-fluid interfaces in a centrifuge tube and operational stability of a partially filled tanker truck driving over a bump.

MSC:

[76M10](#) Finite element methods applied to problems in fluid mechanics

[76D05](#) Navier-Stokes equations for incompressible viscous fluids

[65Y05](#) Parallel numerical computation

Cited in **22** Documents

Keywords:

stabilized-finite-element/interface-capturing method; two-fluid interfaces; free surfaces; interface-sharpening technique; global mass conservation; CRAY T3E parallel supercomputer; centrifuge tube; partially filled tanker truck

Full Text: [DOI](#)

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