1040-76-16 **F. S. Sousa*** (fsimeoni@icmc.usp.br). *A moving-mesh finite element method for simulating 2D incompressible two-fluid flows.*

An Arbitrary Lagrangian-Eulerian (ALE) moving-mesh method to solve incompressible two-dimensional two-fluid flows is presented. The Navier-Stokes equations are discretized by a Galerkin Finite Element method. A projection method based on approximated LU decomposition is employed to decouple the system of non-linear equations. The interface between fluids is sharply represented by marker points and edges of the computational mesh. Our method employs a technique which moves the nodes of the Finite Element mesh with arbitrary velocity, controlling the quality of the mesh by a remeshing procedure, avoiding bad triangles by flipping edges, inserting or removing vertices from the triangulation. The relative velocity in the ALE approach is designed to allow for a continuous improvement of the mesh, thus reducing the amount of remeshing required to control the quality of the mesh. Results of numerical simulations are presented, illustrating the improvements in computational cost, mass conservation, and accuracy of this new methodology. (Received December 21, 2007)