

Simulation of free surface fluids in incompressible dynamique

Monday, 12 December 2016 11:30 (30 minutes)

In this work, we present a numerical scheme for solving free surface flows. The free surface is modeled using the level-set formulation. Besides, the mesh is anisotropic and adapted at each iteration. This adaptation allows us to obtain a precise approximation for the free- surface location. In addition, it enables us to solve the time-discretized fluid equation only on the fluid domain. The fluid here is considered incompressible. Therefore, its motion is described by the incompressible Navier–Stokes equation which is temporally discretized using the method of characteristics and is solved at each time iteration by a first order Lagrange–Galerkin method. The level-set function representing the free surface satisfies an advection equation which is also solved using the method of characteristics. The algorithm is completed by some intermediate steps like the construction of a convenient initial level-set function (redistancing) as well as the construction of a convenient flow for the level-set advection equation. Finally, some numerical results are presented.

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