MARKER-BASED, 3-D ADAPTIVE CARTESIAN GRID METHOD FOR MULTIPHASE FLOW AROUND IRREGULAR GEOMETRIES

Fact Sheet

Project Information

CART3DADAPT

Grant agreement ID: 268426

Status
Closed project

Start date
8 February 2012

End date
7 February 2016

Funded under
FP7-PEOPLE

Overall budget
€ 100 000

EU contribution
€ 100 000

Coordinated by
MIDDLE EAST TECHNICAL UNIVERSITY
Turkey

Objective

Computational simulations of multiphase flow are challenging because many practical applications require adequate resolution of not only interfacial physics associated with moving boundaries with possible topological changes, but also around three-dimensional, irregular solid geometries. This project focuses on the simulations of fluid/fluid dynamics around complex geometries, based on an Eulerian-Lagrangian framework. The approach envisions using two independent but related grid layouts to track the interface and solid boundaries. In particular, the stationary Cartesian grid with automated local adaptive refinement capabilities is to handle the computation of the transport equations, while the interface shape and movement are treated by marker-based triangulated surface meshes which freely move and interact with the Cartesian grid. The markers are also used for identifying the location of the

solid boundaries and enforcing the no-slip condition there. Issues related to the contact line treatment, topological changes of multiphase fronts during merger or breakup of objects, and necessary data structures and solution techniques will be investigated. Validation studies will be carried using (i) interface in a time-reversed vortex field (ii) effect of spurious currents (iii) Buoyancy driven rising bubble (iv) Drop impacting on a flat surface (v) Binary drop collision.

Field of science

/natural sciences/mathematics/pure mathematics/geometry
/social sciences/social and economic geography/transport

Programme(s)

Topic(s)

Call for proposal

FP7-PEOPLE-2010-RG

Funding Scheme

MC-IRG - International Re-integration Grants (IRG)

Coordinator

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Website

Activity type
Higher or Secondary Education Establishments

Contact the organisation

EU contribution
€ 100 000

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