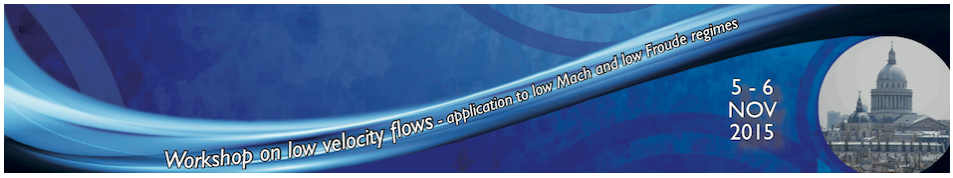

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An all-regime Lagrange-Projection like scheme for 2D homogeneous models for two-phase flows on unstructured meshes

vendredi 6 novembre 2015 11:00 (45 minutes)

We propose an all regime Lagrange-Projection like numerical scheme for 2D homogeneous models for two-phase flows. By all regime, we mean that the numerical scheme is able to compute accurate approximate solutions with an under-resolved discretization, i.e. a mesh size and time step much bigger than the Mach number M of the mixture.

The key idea is to decouple acoustic, transport and phase transition phenomenon using a Lagrange-Projection decomposition in order to treat implicitly (fast) acoustic and phase transition phenomenon and explicitly the (slow) transport phenomena. Then, extending a strategy developed in the case of the usual gas dynamics equations, we alter the numerical flux in the acoustic approximation to obtain an uniform truncation error in term of M. This modified scheme is conservative and endowed with good stability properties with respect to the positivity of the density and preserving the mass fraction within the interval (0,1).

Numerical evidences are proposed and show the ability of the scheme to deal with tests where the flow regime may vary from low to high Mach values.

Orateur: GIRARDIN, Mathieu (CMAP, Ecole Polytechnique)