Assessment of mesh adaptation algorithms for LES and DES simulation of detached flows

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ABSTRACT

The proposed communication, discusses the adaptation of a transient fixed point adaptation algorithm to the computation of detached flows with LES of VMS type [3, 4] and DDES (Delayed Detached Eddy Simulation) models.

The Transient Fixed Point adaptation algorithm relies on a representation of the mesh by a Riemannian metric [1]. We seek for an optimal metric according to a criterion prescribed by the user. In the Transient Fixed Point, the metric, and then the mesh, is frozen for the timesteps of a subinterval of the time interval. Several strategies are possible in the choice of the subinterval size, from a rather small interval allowing to follow many details to an interval of one or several main periods, and will be discussed during the presentation. Iterative remeshings are applied in order to reach some fixed point, see [2]. Refinement criteria involve Mach number fields for resolution boundary layers and pressure time derivatives in order to better capture acoustics.

Flows around cylinder with Reynolds number from 3900 to 1 million, airfoils with mean and high angle of attack and a Caradonna rotor will be considered for the evaluation, with comparison with experiments and calculations with taylored fixed meshes.

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