Seventh HRLM Symposium, 19-21 September 2018, Berlin, Germany

Session:

Adaptive Mesh Refinement with a hybrid RANS/LES strategy and overset grids

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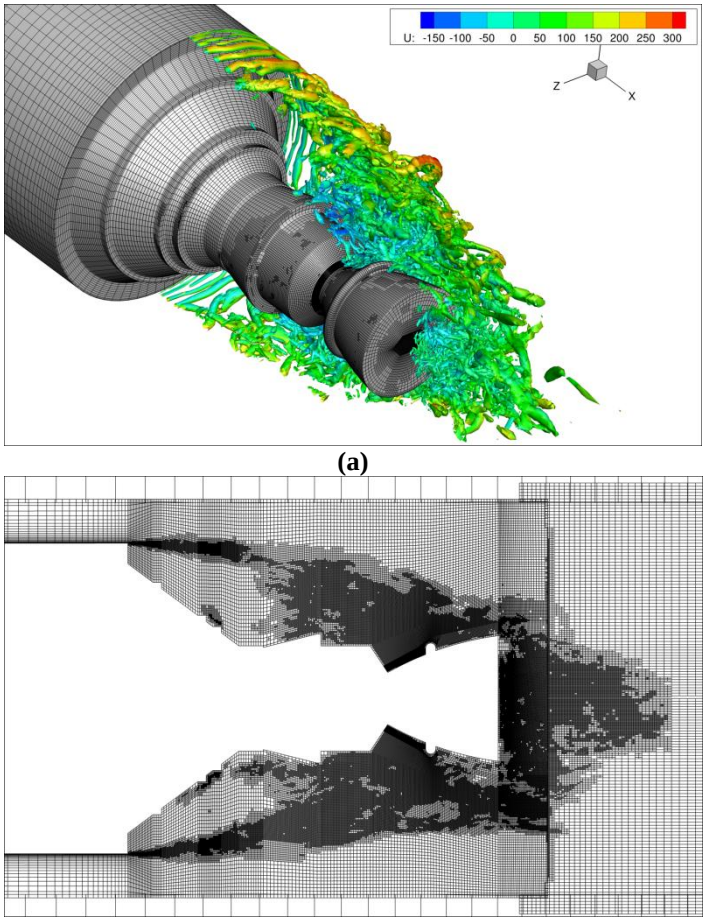
Abstract

A simulation strategy combining *octree*-AMR[1] and HRL[2] turbulence modeling with overset grids is investigated in FLUSEPA, the Finite Volume solver developed by ArianeGroup. The numerical discretization is based upon a third-order accurate upwind spatial scheme with a possible local fourth-order recentering described in [1] and an explicit second-order accurate Heun scheme with adaptive integration in time. Here "adaptive integration" means that each cell is advanced, if possible, with a time step close to its own admissible time step. We use a Delayed Detached Eddy Simulation [2] approach based on either a $k-\varepsilon$ or a Spalart-Allmaras RANS model where the characteristic size Δ is similar to the definition of Chauvet *et al.* [3]. The variables of the AMR-refined cells are projected using a third-order accurate conservative method. Results are presented for a backward facing step and cylindrical backward facing step, which represent good prototypes of after body configurations. We study the influence of the refinement criteria for the AMR and compare the results to previous fixed-grid studies. Finally, the methodology is applied to the numerical simulation of the buffeting of an A5 model, see Figure 1.

[1] Adaptive Mesh Refinement
[2] Hybrid RANS/LES

Session:



(a)

(b)

Fig. 1 Ariane 5 model buffeting using a $k-\varepsilon$ HRL model and an AMR method. (a): Q criterion colored by axial velocity. (b): slice of the AMR overset meshes in the recirculation area

References

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