ANISOTROPIC ADAPTATION FOR VISCOUS FLOWS)

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ABSTRACT

The paper is dedicated to the problems of anisotropic adaptation applied for viscous high-Reynolds flows. Typical anisotropic adaptation algorithm (see e.g., [1], [2]) for unstructured grid is creating a new grid at every adaptation steps using a metric tensor field as a definition of grid spacing. The error estimator which provides the metric tensor field is based on interpolation error which for the second order solver is proportional to the Hessian. This approach produces quality results for inviscid flows however when applied for viscous flows it underestimates the thickness of the boundary layer cells adjacent to the wall. In order to remedy this situation author proposes modification to the Hessian based estimator by adding additional gradient based component. Such modified approach has been successfully applied to the high Reynolds number 2D flows, e.g., multi element airfoil L1T2 (see Fig. 1).

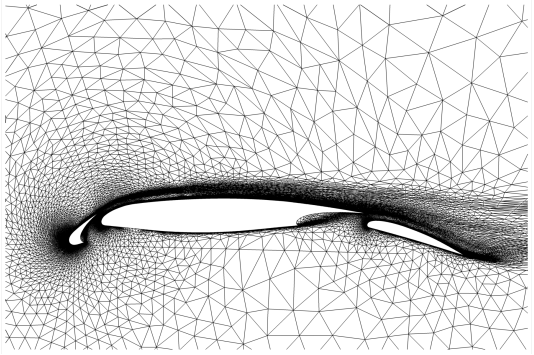
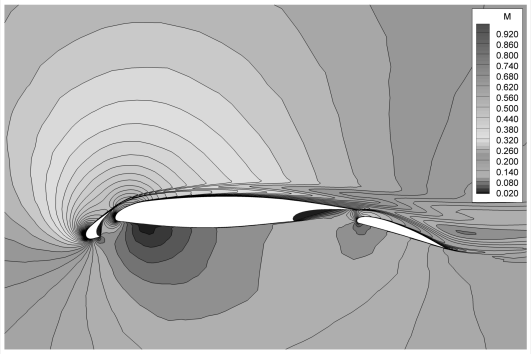
a)  b) 

Figure 1: Mach number field and the corresponding grid after 8 adaptation steps (L1T2)

REFERENCES

[1] M. J. Castro-Daz, F. Hecht, and B. Mohammadi, New progress in anisotropic grid adaptation for inviscid and viscous flows simulations, *Technical Report RR-2671*, INRIA, (1995)

[2] P. L. George and H. Borouchaki, Delaunay Triangulation and Meshing - Application to Finite Element, *Hermes*, (1998)