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GOAL-ORIENTED MESH ADAPTATION WITH APPLICATIONS TO RANS FLOWS

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RANS models are in general not appropriate for the simulation of detached flows; they can nevertheless predict the main flow features and the forces and moments for specific configurations like airfoils at high angles of attack. The corresponding numerical solution is generally very sensitive to the discretization of the flow computational domain and the selected turbulence model. In order to improve the solution quality, goal-oriented mesh adaptation techniques may be applied. The sensitivity of forces and moments with respect to volume mesh coordinates is studied and an adequate mesh adaptation may be carried out using the adjoint discrete method[1, 2]. This analysis allows to detect the most sensitive geometric zones and aerodynamic parameters. The ONERA finite-volume compressible *elsA* flow solver is used and specifically the Spallart-Allmaras turbulence model is employed. The mesh adaptation in particular for rotor blade airfoils is studied. The comparison with respect to standard grid convergence studies will be addressed and its efficiency will be assessed. The detected zone in which mesh refinement is needed for Euler and RANS applications will be compared.

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