Adaptive Discontinuous Galerkin Methods in Aerodynamic Flow Simulations

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Important quantities in aerodynamic flow simulations are the drag, lift and moment coefficients. Error estimation and goal-oriented refinement approaches have been developed for the accurate and efficient computation of single force coefficients. These approaches are based on computing an adjoint solution related to each of the force coefficients under consideration. The resulting goal-oriented adaptively refined meshes are specifically tailored to the accurate computation of the force coefficient under consideration, see e.g. [1, 3].

This approach has been extended to the accurate and efficient computation of multiple target quantities. Instead of computing multiple adjoint solutions, one for each target functional, the new approach is based on the computation of one adjoint and one adjoint-adjoint solution. This way only two auxiliary problems are required irrespective of the number on target functionals, see [2, 4].

Numerical results shown in this talk include 2d and 3d aerodynamic flows.

References

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