Development of Car Drag Reduction Techniques by Controlling Unsteady Flows around a Car

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Abstract

Large eddy simulations (LES) are done for two vehicle models, for which drag reduction have been confirmed by wind-tunnel tests. The objective of these simulations is to clarify reduction mechanism of the aerodynamic drag by means of shape control. Difference in wake flow and flow under the car models is confirmed, and we have found important features of the air flow to be investigated by LES in the future where further refinement of the computational mesh will be necessary. LES shows reduction of drag only for one model while wind-tunnel tests show reduction of drag for both models. This discrepancy is most likely to be attributed to insufficient resolution of the computational mesh, and it is expected that the mechanism can be clarified by the refined-mesh LES.

Keywords: large-scale simulation, reduction of environmental load, vehicle aerodynamics