FLOW AND TURBULENT STRUCTURES AROUND SIMPLIFIED CAR MODEL USING OPENFOAM®

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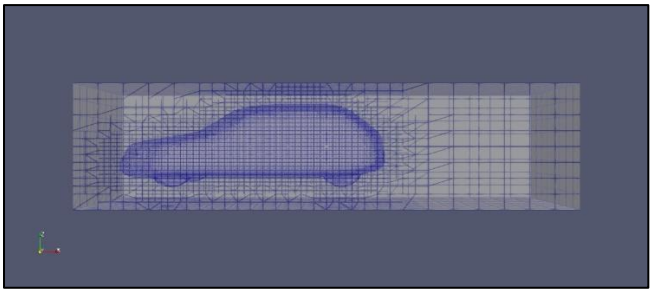
ABSTRACT

The external car aerodynamics is vital in determining the car efficiency , comfort, and car rideability. The flow over and under the car body shows three dimensional and unsteady turbulent characteristics. Moreover, vortex shedding , flow reattachment and recirculation bubbles are formed around the bluff body. These influence the lift and drag parameters which directly affect the efficiency and car rideability. The main aim of this study is to validate the results through OpenFoam and match with the results as obtained by Aljure et al., using Ansys Icem CFD software. The author has used several modules of LES models and compared the results against the obtained experimental analysis. The snappyHexMesh utility is used here to generate 3-Dimensional mesh to carry out this research study through OpenFoam .

Keywords : vortex shedding , flow reattachment , LES model , snappyHexMesh, OpenFoam

PROBLEM STATEMENT



The present study is carried out in OpenFoam , using FVM. The referred research study was focused on the assessment of LES model , as well as to show the capabilities of capturing the large-scale turbulent flow structures in car-like bodies using relative coarse grids.
The rectangular computational domain of 8.1meter x 2meters x 2meters is considered.
Asmo Car was made by Mercedes-Benz in the 90s to investigate low drag bodies in automotive aerodynamics and testing CFD codes.

REFERENCES

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