Hyundai Motor's 4th NVH open BMT - Wind noise prediction on the HSM (Hyundai simplified model) using Ansys Fluent and LMS Virtual.Lab.

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ABSTRACT

Assessment of aerodynamic noise is becoming increasingly important for automotive manufacturers. Flow passing a vehicle may indeed lead to high interior noise level and affect cabin comfort. Interior noise results from various mechanisms including aerodynamic fluctuations of the disturbed flow around the side mirror or pillar, hydrodynamic and acoustic loading of the car panels and windows, vibration of these panels and acoustic radiation inside the vehicle. Objective of the present study is to capture these important mechanisms in a simulation model and demonstrate the ability of the combined simulation tools Fluent / Virtual.Lab to provide accurate aerodynamic and interior noise prediction results. Previous study focused on the noise generated by the turbulence around the A-pillar structure of the HSM (Hyundai simplified model). The present study also includes the effect of the side-mirror and rain-gutter structures. Complete modeling process is presented including details on the unsteady CFD simulation and the vibro-acoustic model with absorption materials. Guidelines and best practices for building the simulation model are also discussed.

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