Validation of a wind noise source characterization method for vehicle interior noise prediction – latest results
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Recent developments in the prediction of the contribution of windnoise to the interior SPL have opened a realm of new possibilities in terms of i) how the convective and acoustic sources terms can be identified, ii) how the interaction between the source terms and the side glass can be described and finally iii) how the transfer path from the sources to the interior of the vehicle can be modelled. This work discusses in details these three aspects of wind noise simulation and recommends appropriate methods to deliver required results at the right time based on i) simulation and experimental data availability, ii) design stage at which a decision must be made and iii) time available to deliver these results. Several simulation methods are used to represent the physical phenomena involved such as CFD, FEM, BEM, FE/SEA Coupled and SEA. Furthermore, a 1D and 2D wavenumber transformation is used to extract key parameters such as the convective and the acoustic component of the turbulent flow from CFD and/or experimental data whenever available. This work focuses on the validation of the wind noise source characterization method and the vibro-acoustic models on which the wind noise sources are applied.