

## **ISNVH Graz 2008**

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### Title:

Interdisciplinary Approaches for Optimizing Vehicle Interior Noise

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Psychoacoustics, Binaural Transfer Path Analysis, Binaural Transfer Path Synthesis, Driving Simulator, Explorative Vehicle Evaluation

### Abstract:

The consideration of comfort and quality criteria becomes more and more important in the development of vehicles. Emotional, affective aspects increasingly replace factual, objective demands and influence purchase decisions. In particular, the interior noise as the acoustical fingerprint of the product, subliminally informs the driver about functionality, quality, performance and safety. Thus, the optimization of interior noise must be carried out considering functional, psychoacoustic and psychological factors at the same time. In order to perform the task adequately, combined tools and methods have to be applied. Binaural Transfer Path Analysis and Synthesis allow for the prediction of interior sound and vibration during the vehicle development. By means of acoustic simulation causes of disturbing noise can be identified and the potential of specific hardware modifications can be estimated. To assess virtual modifications aurally, synthesized noise and its modifications are interactively experienced in an acoustic driving simulator providing a realistic environment. It is possible to interactively evaluate even the influence of individual transfer paths or specific combinations.

In this context, detailed target specifications can be determined, which match the (desired) image, design, appearance, etc. of the vehicle using adapted subject-centred methods.

If sound and vibration are not considered as disturbing elements only regarding the NVH comfort but as factors actively contributing to a high product quality impression, the application of multi-dimensional approaches integrating new and interdisciplinary methods is indispensable.