Auralization of simulated structural modifications

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Binaural **T**ransfer **P**ath **A**nalysis and **S**ynthesis (BTPA/BTPS) are well-known tools for troubleshooting and sound design of vehicle interior noise. BTPA/BTPS enable exploring the causative mechanisms for noise transfers, based on measurements of excitation source strengths and the corresponding structure-borne and airborne transfer paths to a receiver position. The results of these methods represent a considerable milestone with respect to acoustic simulation and auralization. The engineer can analyze and listen not only to the overall sound comparable to a binaural recording of the vehicle interior sound, but also to components of the total noise transmitted via a single path or a combination of paths to identify the cause of a particular disturbing noise pattern.

An extension of time-domain transfer path analysis will be presented where structure-borne paths can be described using two-port networks, and results can be simulated with immediately audible results. This presents new possibilities for NVH design, where effects of changes in engine mount geometry and material properties can be predicted via **F**inite **E**lement **A**nalysis (FEA) calculations, and vehicle interior sound can be auralized using only engine dynamometer input data.