

Simulated Pass-By Noise Using Microphone Array and Noise Synthesis Technology

Simulation von Vorbeifahrtgeräuschen unter Verwendung von Mikrofon-Array und Geräusch-Synthese-Technologie

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Abstract

Pass-by measurements according to the ISO 362 are a standard test procedure for new vehicles. The vehicle passes the test successfully if the measured SPL is within legal restrictions regardless of the sound quality. Since there are only few test tracks available and the measurements depend on environmental conditions, the development of sophisticated indoor test procedures is required. For it, the vehicle can be placed on a chassis dynamometer and by applying special measurement set-ups (microphone array) and synthesis algorithms the respective pass-by noise can be simulated. Furthermore, vehicle exterior noise is increasingly understood as a message to a potential customer. For manufacturers, the following questions cannot be answered on the basis of measurements according to ISO 362. How does each component contribute to the total exterior noise? Which component modifications result in a significant improvement of the total pass-by sound pattern? Therefore, approaches are needed which allow for coping with the mentioned tasks. In this context, procedures are developed and applied, which are based on near-field measurements at dominant noise sources and airborne transfer functions between sources and far-field. The paper presents approaches to simulate pass-by noise in the time domain and discusses their advantages and disadvantages.