Conception of a Noise and Vibration Hardware-In-The-Loop Test Bed

Hardware-In-The-Loop (HiL) techniques applied to noise, vibration and harshness (NVH) problems make it possible to test components of complex systems and their effects under realistic boundary conditions. The method can be used in cases where the setup of the full system in the laboratory requires high efforts and costs or where the virtual component is modified frequently during the design process. The HiL concept allows to take into account non-linear effects of the physical component as well as effects, which are not included in the model, such as temperature changes during test. HiL can enable a rapid prototyping approach as modifications on the physical component show direct acoustic and vibrational effects on the real system. In this contribution we outline the design and conception of a noise and vibration HiL test exemplary for an automobile component. Criteria for the use of HiL vibration and noise tests are discussed and applied to the design process of a transmission crossbeam. In this case the transmission crossbeam is the virtual component, which is simulated by an actuator and sensor system, and a body-in-white is the physical component.

Stichworte:
hybrid testing, hardware-in-the-loop, real-time substructuring, interface synchronization

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