Identifiant de la contribution : **209** Type : **non spécifié**

”DYN1#4 - Control of an acoustic mode by a digitally created Nonlinear Electroacoustic Absorber at low excitation levels: Analytical and Experimental results”

mardi 11 juillet 2023 15:00 (20)

Noise reduction becomes important to raise acoustical comfort and to prevent the population from additional disorders. Acoustic passive devices such as acoustic foams and passive resonators have their limitations. Active Noise Control has a high energy consumption and works well only in local zones. The concept of Impedance Control is very efficient around its resonant frequency. The Impedance Control concept lies on a loudspeaker collocated to microphones, and equipped of a processor, named as Electroacoustic Absorber. By calculating and injecting the electrical current into the loudspeaker coil based on the sensed pressure, one can be able to provide a desired linear behavior for any loudspeaker. This linear behavior is generally experimentally implemented through the Infinite Input Response (IIR) method to control the absorption and reflection conditions on the loudspeaker membrane. The IIR method is limited to linear regimes. Passive nonlinear systems are efficient for large frequency widths, both in transient and stationary regimes, but usually activated at high excitation amplitudes. As a result, our work focuses on the creation of a Nonlinear Electroacoustic Absorber (NEA) at low excitation amplitudes. This work is based on an innovative method, allowing to digitally program any nonlinear desired behavior of the loudspeaker for all excitation amplitudes. It is a Real Time Integration (RTI) method, where the current is calculated at each time step, based on the measured pressure. To show the advantages of this device, a NEA is coupled with an acoustic mode of a tube at a normal incidence. Multiples nonlinear behaviors are shown at low excitation amplitudes, and compared with linear control devices. Analytical and Experimental results will be presented and discussed.

Presenter(s) : MORELL MAXIME

Classification par session : Survishno 4 / Dynamic modelling 1