

Excitation Experiments of a Cone Loudspeaker and Vibration-Acoustic Analysis Using FEM

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Abstract : To focus on the vibration mode of a cone loudspeaker, which acts as an electroacoustic transducer, excitation experiments were performed using two types of loudspeaker units: one employing an impulse hammer and the other a sweep signal. The on-axis sound pressure frequency properties of the loudspeaker were evaluated, and the characteristic properties of the loudspeakers were successfully determined in both excitation experiments. Moreover, under conditions identical to the experiment conditions, a coupled analysis of the vibration-acoustics of the cone loudspeaker was performed using an acoustic analysis software program that considers the impact of damping caused by air viscosity. The result of sound pressure frequency properties with the numerical analysis are the most closely match that measured in the excitation experiments over a wide range of frequency bands.

Keywords : anechoic room, finite element method, impulse hammer, loudspeaker, reverberation room, sweep signal

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