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Measurement of low-frequency sources in non-anechoic room using near-field acoustic holography

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Low frequency (20 Hz-200 Hz) measurements of sound sources are rather difficult to perform because free field conditions can not be easily achieved properly. Moreover, some industrial sources have to be measured in situ. In such a case, a Field Separation Method (FSM) can be used to subtract the pressure field reflected by walls of the testing room from the measured data. This approach required the knowledge of both acoustic pressure and velocity on a closed surface surrounding the source. In this paper, a spherical harmonic expansion of measured data is used to solve the problem. The proposed method is applied to the measurement of the frequency response of a closed box subwoofer tested under various conditions: in a room with variable reverberation time (6.4 s to 0.6 s). Theoretical frequency response of the subwoofer is also calculated using the Thiele and Small model. Results show a good agreement between separated data and simulations. The influences of the measurement distance and of the measurement point number required on the separation process are discussed.