

The Optimal Parameters of Loudspeaker Panel

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ABSTRACT

The influence of each parameter of rectangular panel on its SPL curve is discussed, including the panel's aspect ratio and structure, the coil diameter, and the system's damping. The harmonic analysis of the panel is performed using the FE software ANSYS. Experiments are performed to insure its correctness. Then, based on the FE model, the displacement response spectrum of the panel determined in the FEA is used to calculate the sound pressure radiated from the vibrating panel. The SPL curve of the panel is constructed in the sound radiation study of the panel. The influence of the changes of the parameters on SPL curve is studied, so as to find the optimal aspect ratio range of the rectangular panel. In the sensitivity analysis, it has been shown that the optimal aspect ratios for panels mode of pure balsa($E_1/E_2=67.273$), foaming panel($E_1/E_2=1$), carbon sandwich panel($E_1/E_2=18.322$) are in the range from 1.6 to 1.9. Besides, for panels with aspect ratios out of the above specified range, it has been shown that use of carbon composite reinforced panel can make the loudspeaker produce better and pleasing sound.