Optimal Design and Manufacture of Double Flat-Panel Speakers Stiffened by Nano-Carbon Tube Composites

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ABSTRACT

The main object of this paper is designed and developed a double flat-panel speaker stiffened by nano-carbon tube composites which it had thin thicknesses, broad frequency and acoustic fidelity vigorous not distorted it. Two types of vibrating plate, namely, a high audio speaker and medium-low audio speaker constructed on the basis of the manufacture technique and sound pressure theory are developed for the design and analysis of double flat-panels. The study is analyzed the frequency and sound pressure value of double flat-panel speakers with different design parameters such as stiffness and weight of composite panels, boundary condition and spring constant of suspension system and vibration area which are constructed using a finite element constructed on the basis of the software ANSYS. The double flat-panel speakers can be applied to the general plane video and music electronic products loudspeaker system, achieves nowadays pursues the monitor more and more thin tendency. The double rectangular flat-panel speaker can be used in dual-channel flat-panel speakers for portable DVD players and notebook computers ... and other products. According to developed the analytical method of a set of simulation and optimal design is proceed to optimal design of multiple objective function for stiffened composite double flat-panels in 100Hz~20KHz frequency zones. The 100Hz~20KHz frequency zones had divide into 4 zones, every zones variable values multiply by weight was the sum that was the objective function of multiple optimal design. In the limit small thrust of low power, is used the optimal method to find the best manufacturing parameters (includes the lengths of flat-panel speaker, spring constant of suspension system, stiffened types and vibration lengths) made the sound pressure value curve had smooth and get the best sound pressure value. Therefore, the optimal manufacturing parameters would manufacture double flat-panels to measured sound pressure curve that compared experimental values and theory values.

Keywords : Double flat-panel speaker ; Strip-shaped exciter ; Finite element ; Manufacturing parameters ; Sound pressure curve

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