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Optimization of sound transmission loss of a composite rectangular plate with infinite baffle

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Abstract

In this paper, by development of the Roussos' method and using the generic algorithm, the optimization of sound transmission loss for a finite rectangular simply supported panel with infinite baffle was considered. Appropriate constraints were imposed to prevent softening effect occurrence due to optimization and the discrete frequencies were chosen based upon the sound transmission class with weighting constant for optimization. Several traditional composite materials were employed for the investigation. The results indicate that, in the mass control region, the optimization of stacking sequence and optimal thickness do not effectively contribute to improvement of the transmission loss due to the close densities of composite materials. In other words, composite plate optimization made of a stiffer materials, has better transmission loss characteristics. The results also show that, the lamina thickness optimization has an important effect to improve the transmission loss but the advantage of low weight composite material is compromised by optimization.

Keywords: Optimization, Transmission loss, Baffle, Composite panel.

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