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Transmission loss of a panel with tuned vibration absorbers

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The transmission loss of a rectangular panel with numerous discrete tuned vibration absorbers is investigated both theoretically and experimentally. The 49 tuned vibration absorbers have a linear distribution of resonance frequencies and were arranged in grid pattern on the rectangular plate. The transmission loss of the plate was measured between two reverberation chambers and was compared with theoretical predictions. In addition, theoretical predictions and experimental measurements were conducted on a similar system where each vibration absorber was replaced with the equivalent mass of the absorber. The numerical computations were conducted on a distributed computing network comprising 200 desktop computers. The results indicate the improvement in sound transmission loss that can be achieved, greater than merely increasing the thickness of the panel (mass law), and also provides a data set for comparison with predictions involving the use of fuzzy-structure theory.