

Abstract Submitted
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Optimum Noise Reduction Methods for the Interior of Vehicles and Aircraft Cabins HASSON M. TAVOSSI, PH.D., Valdosta State University, Department of Physics, Astronomy Geosciences — The most effective methods of noise reduction in vehicles and Aircraft cabins are investigated. The first goal is to determine the optimal means of noise mitigation without change in external shape of the vehicle, or aircraft cabin exterior such as jet engine or fuselage design, with no significant added weight. The second goal is to arrive at interior designs that can be retrofitted to the existing interiors, to reduce overall noise level for the passengers. The physical phenomena considered are; relaxation oscillations, forced vibrations with non-linear damping and sub-harmonic resonances. The negative and positive damping coefficients and active noise cancelations methods are discussed. From noise power-spectrum for a prototype experimental setup, the most energetic vibration modes are determined, that require the highest damping. The proposed technique will utilize the arrangement of uniformly distributed open Helmholtz resonators, with sound absorbing surface. They are tuned to the frequencies that correspond to the most energetic noise levels. The resonators dissipate noise energy inside the vehicle, or aircraft cabin, at the peak frequencies of the noise spectrum, determined for different vehicle or aircraft cabin, interior design models.

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