

Investigation on Quiet Zones Created By Remote Impedance Control

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Abstract

Quiet zones and other sound zones have been a strong topic of research for some time, due to the interest of creating separate sound environments in a same room, in a large open-space office for example. A number of solutions have been proposed over the last years. This paper further investigates the solution proposed by Boulandet et al. in 2017, generating a large quiet zone by mean of remote impedance control. We show here that a number of parameters have a strong influence on the performances of the system, namely the size and shape of the quiet zone, the average sound attenuation obtained and the array effort produced by the loudspeakers. We present the results of a number of full wave simulations, in the frequency domain, using the Acoustics module of COMSOL Multiphysics®. The simulations include realistic loudspeaker governing equations and the implementation of a control strategy calculated with MATLAB®, to provide insight on the effect of the chosen parameters. We also present experimental results showing the validity of the COMSOL simulations.

Figures used in the abstract

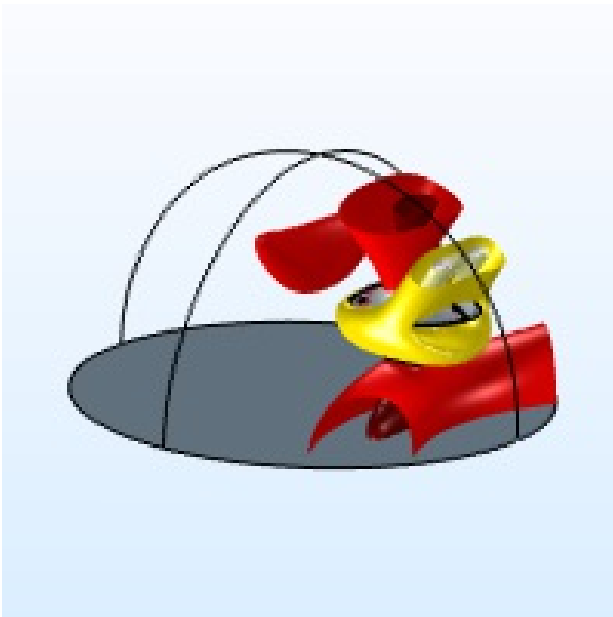


Figure 1: Remote impedance quiet zone simulation.