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Global sensitivity analysis for vibroacoustics of lightweight structure

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Noise reduction is an important issue in the aerospace industry, as the very harsh acoustic environment inside the launcher may damage the payload, especially at lift-off. Because weight is a major concern in flying structures, and a high stiffness is required, launcher structures are made of very complex composite materials, which exhibit poor sound insulation properties. Porous materials are therefore used to reduce sound levels inside the payload cavity in a broadband frequency range.
At early stages of conception, parameters can vary in broad design ranges. In order to reduce the number of parameters of the model, global sensitivity analysis is therefore needed to identify the most influential ones. A method for global sensitivity analysis of sound transmission to design parameters is proposed in this work, making use of the Fourier amplitude sensitivity test (FAST) technique.

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