A practical multiscale approach for optimization of structural damping

A simple and practical multiscale approach suitable for topology optimization of structural damping in a component ready for additive manufacturing is presented. The approach consists of two steps: First, the homogenized loss factor of a two-phase material is maximized. This is done in order to obtain a range of isotropic microstructures that have a connected stiff material phase. Second, the structural damping of the component is maximized using material interpolations based on the homogenized properties of the microstructures. In order to achieve convergence towards a discrete set of material phases in the macroscopic problem, a material interpolation that favors values close to the predefined material densities is introduced.

General information
State: Published
Organisations: Department of Mechanical Engineering, Solid Mechanics, Department of Electrical Engineering, Acoustic Technology
Contributors: Andreassen, E., Jensen, J. S.
Pages: 215-224
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Structural and Multidisciplinary Optimization
Volume: 53
Issue number: 2
ISSN (Print): 1615-147X
Ratings:
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 3.26
Web of Science (2017): Impact factor 2.876
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.14
Web of Science (2016): Impact factor 2.377
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 2.42
Web of Science (2015): Impact factor 2.208
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 2.77
Web of Science (2014): Impact factor 1.974
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 2.86
Web of Science (2013): Impact factor 1.696
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 2.08
Web of Science (2012): Impact factor 1.728
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 1.85