MULTISCALE TOPOLOGY OPTIMIZATION USING WAVELETS

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The objective of the work is to present some recent efforts to carry out topology optimization in the multisaled design space. The multiscale design space consists of multiscaled design variables that are transformed from the standard density design variables by wavelets [1]. The main motivation of this wavelet-based multiscale approach in design optimization [2,3,4] is to handle manufacturing issues better and to improve solution efficiency. In the multiscale space, design optimization can be carried out in multiresolution, so designs having different levels of complexity or connectivity can be rather systematically obtained without imposing explicit perimeter-type controls. In addition, feature size control which is often necessary in MEMS designs can be effectively achieved. When the multiscale design methodology is fully integrated with a multiscale numerical analysis method such as the multiscale Wavelet-Galerkin method [5,6,7], it allows both design resolution and analysis resolution to be adaptively adjusted during optimization iterations.

References

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