

Topology optimization of structures for minimizing transient dynamic response

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ABSTRACT

This paper presents an open-source topology optimization framework for minimizing dynamic response subjected to transient loads. To analyze the dynamic response of the system under time-varying loads, the Generalized- α method is employed. The mechanical model assumes a dynamic response for a linear elastic isotropic material. The objective is to minimize dynamic response, and this is achieved through a formulation based on density-based topology optimization. The Optimality Criteria (OC) method has been used to update the design variables. Material stiffness interpolation is accomplished using the Solid Isotropic Material with Penalization (SIMP) method. Numerical examples are presented to assess the effectiveness of the proposed approach and the efficiency of the optimized designs. The results from these optimized designs highlight the capability of topology optimization to significantly reduce transient responses in structures.