

Topology Optimization of Members of Dynamically Loaded Flexible Multibody Systems using Integral Type Objective Functions and Exact Gradients

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Abstract

In this work a procedure is presented to perform topology optimization of components of flexible multibody systems, which are modeled with the floating frame of reference formulation. For the topology optimization, the solid isotropic material with penalization (SIMP) method is used. In order to capture the actual loads on the flexible components in the optimization, integral type objective functions are employed and exact gradients are provided. The latter are computed by the adjoint variable method to handle the large number of design variables.

Keywords: topology optimization; flexible multibody systems; integral type objective function; sensitivity analysis; adjoint variable method.