

TOPOLOGY OPTIMIZATION: HYBRIDIZATION OF PARTIAL SOLUTION VERSUS TRADITIONAL MULTI-GOAL METHODS

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ABSTRACT

In a recent project [8] the authors have developed an approach to assist the identification of the optimal topology of a technical system capable to overcome geometrical contradictions that arise from conflicting design requirements. The suggested method is based on the hybridization of partial solutions obtained from mono-objective topology optimization tasks. In order to investigate efficiency, robustness and potentialities of hybridization, a comparison among the proposed approach and the traditional Topology Optimization methods is here presented. The application of the proposed hybridization approach to several case studies of multi-objective optimization problems available in literature has been performed with the aim to evaluate the robustness of the method, through a direct benchmark between the hybridized topology and the traditional methods. The obtained results demonstrate that the proposed method is computationally definitely less expensive than the conventional application of Genetic Algorithms to topological optimization, still keeping the same robustness in terms of searching the global optimum solution. Moreover, the comparison among the hybridized solutions and the solutions obtained through traditional topology optimization methods, shows that the proposed approach often leads to very different topologies having better performance.