Robust Topology Optimization under Loading Uncertainties using Altair HyperWorks

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Abstract

Optimization has become a way of life. It is essential to optimize the available resources. This paper presents topology optimization and robust optimization as applied in the field of mechanical engineering and links these two together. A background study is performed to give the reader an overview of the previous research carried out in the said field of topology optimization and robust optimization. In the methodology section, an analytical approach is presented explaining the theory involved during the design process considering only the loading uncertainties followed by an attempt to set up the optimization problem in the software package. Deterministic optimization results are compared with the robust topology optimization results for different load cases with the help of figures and tables. With this successful attempt at performing robust topology optimization in the software package, the paper is concluded stating that the methodology can be applied to various other forms of uncertainties and also exploring other aspects of the software with respect to robustness.

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