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Comparison of some commercial software systems for structural optimization

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Abstract

Mathematical optimization theories are employed for the design of structures in structural optimization. These days, structural optimization is widely utilized for practical problems due to well-developed commercial software systems. Three representative general-purpose structural optimization systems such as Genesis, MSC.Nastran and OptiStruct are investigated and evaluated by solving various test examples in different scales. The performance of structural optimization depends on the quality of the optimum solution and the computational time, and these aspects are compared from the application viewpoint. For fair comparison, the same formulations are defined, and the same optimization methods are adopted for each example. Also, the same system environment is prepared, and the same optimization parameters are used. Linear static response size, shape and topology optimizations are applied to the examples and the results are compared. No system seems to be the best in all the cases and each system has advantages and drawbacks depending on the application. In general, Genesis is excellent in the computational time while OptiStruct gives excellent solutions, especially in topology optimization. Meanwhile, MSC.Nastran presents excellent solutions in shape optimization.

Keywords: Structural Optimization, Design Software, Performance comparison.