

Considerations on the Updating Process in Density-based Topology Optimization Using the Modified Optimality Criteria Method

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In recent years, design and production technologies have been growing rapidly in the automotive and electrical industries. Accordingly, numerical analysis has become very important. Numerical analysis requires various parameter settings. However, it should be noted that the results may vary depending on the parameter settings. The same can be said for the topology optimization, which is also attracting attention in the manufacturing industries. In this study, we focus on the update equation in the density-based topology optimization. In the topology optimizations based on the homogenization method and density method, the optimality criteria (OC) method^[1] is employed as the update method. However, the conventional OC method requires the setting of several arbitrary parameters such as the move limit, which is a parameter to ensure stable updates, and weighting factor, which is a parameter for update speed. The results in Figures 1 to 3 are for the case when the move limit is not set and the penalization parameter is set to 6.0. When the modified OC method^[2] is employed, the performance function does not increase as sharply as when the OC method is employed. Also, the weighting factor setting mentioned above is not necessary. In order to compare the OC method and modified OC method, the results for different parameter settings will also be presented.

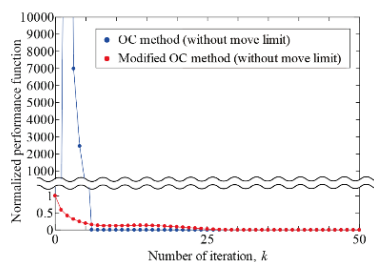


Fig. 1 History of normalized performance function.

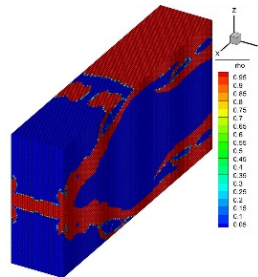


Fig. 2 Final density distribution when using the OC method.

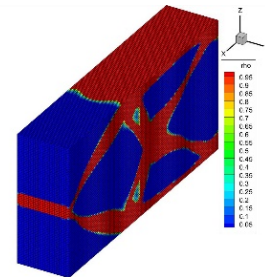


Fig. 3 Final density distribution when using the modified OC method.

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