## ABSTRACT

## Topology Optimization Using Compliance Pattern Based Genetic Algorithm

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Topology optimization is to find the optimal material distribution of the specified design domain minimizing the objective function while satisfying the design constraints. Since the genetic algorithm (GA) has its advantage of locating global optimum with high probability, it has been applied to the topology optimization. However, previous works report that it is difficult to generate reasonably connected structural configuration and it requires high computational cost due to the random nature.

To guarantee the structural connectivity, the concept of compliance pattern is proposed and to improve the convergence rate, small number of population size and variable probability in genetic operators are incorporated into GA. The rank sum weight method is applied to formulate the fitness function consisting of compliance, volume, connectivity and checkerboard pattern.

To substantiate the proposed method design examples in the previous works are compared with respect to the number of function evaluation and objective function value. The comparative study shows that the compliance pattern based GA result on the reduction of computational cost to obtain the reasonable structural topology.