

Topology Optimization Using Genetic Algorithms

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ABSTRACT

Genetic Algorithm, based on the Darwin's survival of fittest principle, is a robust optimization technique in finding global minima. The main advantage of using Genetic Algorithm in topology optimization is that it can find out several optimal or near optimal solutions for problems with or without multiple optima. Traditional GA encodes design variables into a one-dimensional genetic bit-string and thus only one-dimensional crossover operations such as single-point and multi-point crossover operations can be used. However, single-point and multi-point crossovers are geometric biased. A two-dimensional bit-array representation is used in this study and several two-dimensional crossovers are developed. With these less-biased two-dimensional crossovers, better solutions can be found and better efficiency can be achieved.

Keywords : genetic algorithms, topology optimization.

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