

## Application of Metropolis Genetic Algorithm for the Structural Design Optimization

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A Metropolis genetic algorithm (MGA) is developed and applied for the structural design optimization. In MGA, favorable features of Metropolis criterion in simulated annealing (SA) are incorporated in the reproduction operations of simple genetic algorithm (SGA). This way, the MGA maintains the wide varieties of individuals and preserves the genetic information of early generations. Consequently, the proposed MGA alleviates the disadvantages of finding imprecise solution in SGA and time-consuming computation in SA. Performances of MGA are compared with those of conventional algorithms such as Holland's SGA, Krishnakumar's micro genetic algorithm ( $\mu$ GA), and Kirkpatrick's SA. Typical numerical examples are used to evaluate the favorable features and applicability of MGA. The effects of population sizes and maximum generations are also evaluated for the performance reliability of MGA. From the theoretical evaluation and numerical experience, it is concluded that the proposed MGA is a reliable and efficient tool for structural design optimization.

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