عنوان مقاله:

Bi-level Reliability-Based Optimization of Trusses via Competitive Distributed Genetic Algorithm

محل انتشار:

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خلاصه مقاله:

Optimization of structures under the constraint of structural system failure probability is a much time consuming process and thus many researchers have attempted to approximate the probability of structural system failure conservatively as the sum of the members' failure probabilities. In this paper optimization of the trusses is performed in two different levels using parallel genetic algorithm. In the first level, the optimization is done based on the members' failure probabilities to obtain initial population for the second level. Then in the second level, the optimization process is continued under the constraint of structural system failure probability. Using the first level, many inefficient chromosomes are discarded quickly and an initial population is generated for the second level, resulting in saving considerable computational time. In the present study a novel parallel genetic algorithm namely, competitive distributed genetic algorithm (CDGA) is also employed to speed up the optimization convergence. In this method, genetic algorithm parameters and operators are different in each island. Then islands compete to produce own next generations. During the first level of the optimization, the islands which have generated better individuals send their parameters and operators to unsuccessful ones along with their fittest chromosomes. Then the second level optimization process is performed by winner islands' parametersand operators

کلمات کلیدی:

reliability analysis, reliability-based optimization, branch and bound method, structural system failure probability, distributed genetic algorithm

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