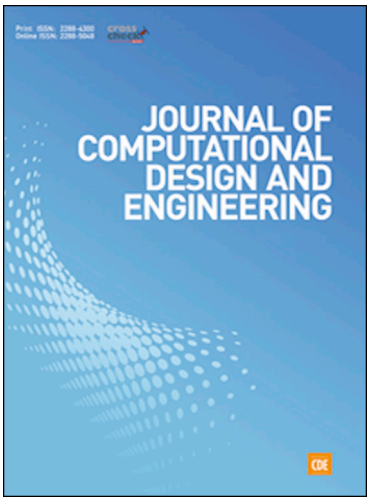

Multi-objective colliding bodies optimization algorithm for design of trusses

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Multi-objective colliding bodies optimization algorithm for design of trusses

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Abstract. This article presents a new population-based optimization algorithm to solve the multi-objective optimization problems of truss structures. This method is based on the recently developed single-solution algorithm proposed by the present authors, so called colliding bodies optimization (CBO), with each agent solution being considered as an object or body with mass. In the proposed multi-objective colliding bodies optimization (MOCBO) algorithm, the collision theory strategy as the search process is utilized and the Maximin fitness procedure is incorporated to the CBO for sorting the agents. A series of well-known test functions with different characteristics and number of objective functions are studied. In order to measure the accuracy and efficiency of the proposed algorithm, its results are compared to those of the previous methods available in the literature, such as SPEA2, NSGA-II and MOPSO algorithms. Thereafter, two truss structural examples considering bi-objective functions are optimized. The performance of the proposed algorithm is more accurate and requires a lower computational cost than the other considered algorithms. In addition, the present methodology uses simple formulation and does not require internal parameter tuning.

Keywords: Design optimization. multiobjective algorithm. truss structural optimization. colliding bodies optimization algorithm. maximin method.

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