عنوان مقاله:

RELIABILITY ASSESSMENT OF TRANSMISSION LINE TOWERS USING METAHEURISTIC ALGORITHMS

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خلاصه مقاله:

Due to the random nature of the variables affecting the analysis and design of structures, the reliability method is considered as one of the most important and widely used topics in structural engineering. Despite the simplicity of moment methods, the answer to problems with multiple design points (the point with the highest probability of failure) such as transmission line towers depends a lot on the starting point of the search; and it may converge to the local optima answer which is not desirable. Simulation methods also require a large number of evaluations of the limit state function and increase the volume and time of calculations. Also, the design point is not calculated in most of these methods. In this study, the reliability index of four transmission line towers was calculated with four metaheuristic algorithms in which the limit state function was defined based on the displacement of nodes and the results were compared with the results of Monte Carlo Simulation (MCS) method. For this purpose, the objective function was defined as the geometric distance between the point on the function of the boundary condition to the origin in the standard normal coordinate system and the constraint of the problem (the limit state function) based on the displacement of the nodes. Random variables in these problems consisting of the cross-sectional area of the members, the modulus of elasticity, and the nodal loads.

کلمات کلیدی:

transmission line towers, reliability index, truss structures, metaheuristic algorithms.