

عنوان مقاله:

Truss Optimization using Imperialist Competition Algorithm and Particle Swarm Optimization Techniques

محل انتشار:

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خلاصه مقاله:

In civil engineering, structure optimization means designing structures in a way that technical problems are considered and, at the same time, minimum costs are imposed on construction. Due to their various applications, truss structures have found increasing importance. As a result of increasing importance attached to lightness of structures and the problems associated with such structures during construction, much research has been conducted on different truss weight optimization methods. Since during optimization procedures, structural analysis must be repeated many times, i.e., while optimization calculations are being performed in Matlab environment, it becomes necessary for Matlab to refer to the structural analysis software repeatedly, the authors first used ANSYS to analyze the trusses referred to in the presented examples and calculated the final truss volumes, maximum and minimum stresses, and the maximum deflection at each node in the truss system. Afterwards, using the required instructions, Matlab software, ICA (imperialist competition algorithms), and PSO (particle swarm optimization) were linked to ANSYS. Subsequently, the best cross section for each truss member as well as its optimum weight is calculated by considering relevant design constraints. Finally, the presented optimization algorithms and their convergence during a certain time period are compared. As it can be observed, depending on the type of truss used in them, the above methods can produce better results

کلمات کلیدی:

Optimization, truss, ANSYS, imperialist algorithm, particle swarm algorithm

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