

Elitist Self-Adaptive Step-Size Search in Optimum Sizing of Steel Structures

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Abstract : This paper covers application of an elitist selfadaptive step-size search (ESASS) to optimum design of steel skeletal structures. In the ESASS two approaches are considered for improving the convergence accuracy as well as the computational efficiency of the original technique namely the so called selfadaptive step-size search (SASS). Firstly, an additional randomness is incorporated into the sampling step of the technique to preserve exploration capability of the algorithm during the optimization. Moreover, an adaptive sampling scheme is introduced to improve the quality of final solutions. Secondly, computational efficiency of the technique is accelerated via avoiding unnecessary analyses during the optimization process using an upper bound strategy. The numerical results demonstrate the usefulness of the ESASS in the sizing optimization problems of steel truss and frame structures.

Keywords : structural design optimization, optimal sizing, metaheuristics, self-adaptive step-size search, steel trusses, steel frames

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