A SELECTIVE TECHNIQUE FOR METAHEURISTIC OPTIMIZATION OF 3D TRUSS STRUCTURES

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Abstract. In this paper, a multiobjective optimization tool based on genetic algorithms (GA) is proposed in order to analyze the structure design of 3D trussed. In this regard, an open source code (SciLab) GA-based was developed. The main aim of this code is the simultaneous optimization of three different objective functions based on a linear combination method, i.e. multiobjective optimization. The first function is the weight of the structure (which is directly related to its cost) and the second is the maximum displacement in the most unfavorable section. The remaining objective function corresponds to the minimization of the Euclidean norm of the stress state in order to get a homogeneous field of internal stresses in all structural sections. Before the evolutionary optimization process of the GA, a sensitivity analysis of the main variables is performed, in order to focus the study on the most sensitive variables.