Solving the problem of mesh cylindrical structure parametric optimization

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The article considers the problem of optimal design of a mesh cylindrical structure. Such structures are widely used in the aerospace industry. Optimal design of these structures allows increasing the efficiency of their use, minimizing the mass, while observing the conditions for strength and stability. The formulation of the problem of mesh construction optimal design in general form is given. The application of various optimal design algorithms using known analytical dependencies is considered. The optimization algorithm is based on the simplex search method, where a partial R-predicate of the admissible domain is used to describe nonconvex smooth boundary sections. The results of solving the optimization problem for a particular design by various methods and the results of calculating the stress-strain state of the corresponding models are presented. The discrepancies in the results are due to the different set of constraints used in the methods in question.

Keywords: *optimal design of structures, mesh cylindrical structure, minimum mass, strength, stability, optimization algorithm, R-functions*

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