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Numerical Investigation of Physically Nonlinear Problem of Sandwich Plate Bending

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Abstract

The present work is devoted to the numerical investigation of geometrically linear problem of bending of sandwich plate with transversal-soft core for the physically non-linear case. The generalized statement of the problem consists in finding a saddle point of some functional. The existence and uniqueness theorem solutions are proved. To solve the problem, we use an iterative process previously proposed by the authors, each step of which is reduced to solving a linear problem of the elasticity theory and finding the projection onto convex closed set. A Matlab software package was developed, numerical experiments for the model problems are performed. The results of numerical experiments show the effectiveness of the proposed iterative method.

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1. Introduction

In order to facilitate construction, while not reducing its carrying capacity the thin-walled membranes in the form of shells are used. Such membranes are widespread in engineering structures, mechanical engineering, shipbuilding, aircraft industry and rocket technology [1-5]. Development, implementation and continual expansion of the use of structural elements a three-layer structure stimulate the development of research on the construction methods of calculating their strength. A three-layer structure have, in particular, the glazing elements (triplexes) of aircraft and shipbuilding products in which the materials of the outer layers have elastic characteristics, by several orders greater than the elastic characteristics of the middle layer (core) material. When creating methods of strength analysis of

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