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BOOK OF ABSTRACTS

MECHANICS OF COMPOSITE MATERIALS

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Eds. V. Tamužs, K. Cīrule, A. Lagzdiņš

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STRESS ANALYSIS FOR A RECTANGULAR THICK PLATE MADE OF A COMPOSITE MATERIAL WITH A SPATIALLY LOCALLY CURVED STRUCTURE UNDER FORCED VIBRATIONS

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Forced vibrations of a rectangular thick plate made of a composite material with a spatially curved structure are considered. It is supposed that the plate ends are clamped and uniformly distributed harmonically changing normal forces are applied to its upper face. The vibrations of the plate are described by the exact three-dimensional linear equations of elasticity theory. The elasticity relations for the plate material are given by the Akbarov–Guz' continuum theory [1]. The problem is solved by employing the FEM. Numerical results related to the stress distribution in the plate and to the influence of spatiality of the local curving in the plate material on this distribution are given. The effect of frequency of the external forces on the stress distribution is also detailed. The problem corresponding to the case where the curving in the plate material structure is spatially periodic was investigated in [2].

REFERENCES

1. S. D. Akbarov and A. N. Guz, Mechanics of Curved Composites, Kluwer Academic Publishers, 2000, 464 p.

2. S. D. Akbarov and I. G. Demiriz, "Stress analysis for a rectangular thick plate of a composite material with a spatially periodically curved structure under forced vibration," Mech. Compos. Mater., 39, No. 3, 235-244 (2003).