Thin-walled FEM model used for the torsion analysis of the ship hull made of composite materials

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ABSTRACT

The basic purpose of this paper is matrix formulation of the problem of structural thinwalled beams with arbitrary open cross-section based on the assumptions introduced by Vlasov, in a way which has been found extremely convenient for the application of computers. We try to follow, as close as possible, already existent techniques used in cases of assemblages of shells to build the thin-walled beams. We use already existent techniques in cases of assemblages of solid beams. So it is easy to implement given stiffness matrix into any computer program for static and dynamic analysis of structures. It is possible to be said that if the theory of thin-walled beams with open cross-section is labeled as exact the technique to be presented will yield also exact results since it does not introduce any additional simplifications. One example is studied using the present theory and the results are compared with a general cross-sectional analysis.

Keywords: Finite elements, thin plates, thin-walled beam analysis

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