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Local buckling of thin-walled structures by the boundary element method. (English)

Zbl 1244.74138

Eng. Anal. Bound. Elem. 33, No. 3, 302-313 (2009).

Summary: In this work a multi-region boundary element formulation for linear local buckling analysis of assembled plate and shallow shell structures is presented. The assembly is divided into sub-regions. In each sub-region, the formulation is formed by coupling boundary element formulations of shear deformable plate bending and two-dimensional plane stress elasticity. Domain integrals appearing in the formulation (due to the curvature and due to the domain load) are transformed into equivalent boundary integrals. Membrane stresses at discrete domain points of each sub-region (plate or shallow shell) in the assembly are obtained from the prebuckling state, resulting in a set of linear buckling equations in terms of the buckling deflection and the buckling load factor. Buckling equation is presented as a standard eigenvalue problem. Results are compared with FEM solutions and it is shown that good accuracy can be achieved with the present multi-region BEM formulation.

MSC:

74S15 Boundary element methods applied to problems in solid mechanics

Cited in **2** Documents

74G60 Bifurcation and buckling

Keywords:

assembled plates and shallow shells; buckling; shear deformation theory; boundary element method

Software:

ABAQUS; LAPACK

Full Text: [DOI](#)

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