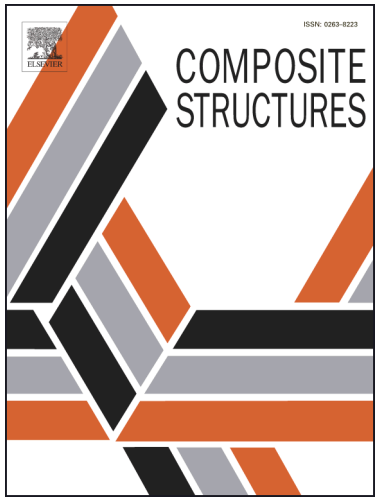

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Boundary Element Analysis of Laminated Composite Shear Deformable Shallow Shells

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Abstract

In this work, a Boundary Element Method formulation for stress analysis of symmetrically laminated composite thick shallow shells is presented. The proposed formulation was obtained by coupling the boundary element formulation of shear deformable symmetrically laminated composite plates and the boundary element formulation for two-dimensional anisotropic plane stress analysis. Formulation uses the elastostatic anisotropic fundamental solutions proposed for these f ormulations. Domain integrals are transformed to the boundary by using the Radial Integration Method. Numerical examples are presented to demonstrate the efficiency and accuracy of the formulation. Obtained results concur with results available in the literature as well as with finite element results.

Keywords: Boundary Element Method, Composite shells, Laminated shells, Shear deformable shells, Stress analysis, Radial integration method

1. Introduction

The use of composite materials in the manufacturing of structural panels for the aerospace industry has sustained a continuous growth over the past few decades. Due to the the complexity in the mechanical response of these materials assembly, the design of composite shell structures requires the use of advanced numerical simulation tools [11].

Traditionally, many works have been developed on the numerical analysis of laminated composite plates and shells using the Finite-Element Method [16], [32], [14], [4], [23]. However, this method presents several challenges, specially related to the need for domainś discretization. This has motivated the accelerated development of meshless methods for the analysis of plates and shells [6], [7], [8], [10], [29], [31], [15].

The Boundary-Element Method (BEM) has been extensively used in the analysis of isotropic and anisotropic plates and shells over the last decade.

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