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# Analysis of laminated composite and sandwich plates based on the scaled boundary finite element method

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## Abstract

A novel approach using scaled boundary finite element method (SBFEM) associated with the precise integration technique (PIT) is proposed for the analysis of laminated composite and sandwich plates. The approach is a layer-wise one. The governing equation is derived strictly based on the three-dimensional theory of elasticity, however, the formulation uses two-dimensional modeling in terms of translational displacements  $u_z$ ,  $u_x$  and  $u_y$  at the nodes. High-order spectral elements enable desired smoothness of the continuity to be achieved. By virtue of the SBFEM, the displacements along the thickness direction are solved analytically. The PIT ensures high accuracy of the results. Numerical examples are provided and comparisons with the results available in the literature have been made. Excellent agreement with the results obtained by exact solutions applying three-dimensional theory of elasticity is reached. Well agreement with other analytical, semi-analytical and numerical solutions are also achieved. High accuracy and efficiency of the proposed approach can be validated.

Keywords: Laminated composite and sandwich plates; Layer-wise theory; Scaled boundary finite element method; Precise integration technique.

## 1. Introduction

In recent times, laminated composite and sandwich plates have been extensively

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