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Analysis of Laminated Composite Plates Vibration Behavior Using a New Simple Finite Element Based on Reddy's Third Order Theory

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Abstract : In this paper a 2D quadrilateral finite element has been developed based on Reddy's third order shear deformation theory for the natural vibration behavior analysis of composites laminated plates. The developed element is a C0 four-nodded isoparametric with seven degrees of freedom (7DOF) at each node. Each node has only three translation components, two rotations and two higher order rotational degrees. In particular, the selective numerical integration technique is introduced in the present FE formulation in order to achieve good results and to alleviate the locking phenomenon. The performance and reliability of the proposed formulation are demonstrated by comparing the author's results with those obtained using the three-dimensional elasticity theory, analytical solutions and other advanced finite element models. The results indicate that the proposed formulation is promising in terms of the accuracy and the convergence speed for both thin and thick plates

Keywords : Third Order Shear Deformation Theory Laminated Composite Plates; Finite Element;Vibration Behavio, Laminated Composite Plates, finite element, Vibration Behavior