

A Simple Efficient Finite Element for the Sandwich and Laminated Composites Plates Analysis

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Abstract : In this work, the theory of Reddy's third order shear deformation Kinematic and from the equivalent approach single layer are used in order to suggest a simple efficient finite element for the analysis of isotropic and composite laminated and sandwich plates. The proposed element is an isoparametric 2D quadrilateral C0 four-node with seven degrees of freedom (7DOF) per node, three translation, two rotations and two higher order rotational degrees. The selective numerical integration technique is presented for the formulation in order to improve the performance of model and to surmount the locking problem in thin plate case. Furthermore, the performance and reliability of the proposed model are investigated by comparing the author's results with those obtained using the three-dimensional elasticity theory, analytical solutions and other advanced finite element models.

Keywords : Third Order Shear Deformation Theory, Laminated Composite Plates, Finite Element Bending Behavior