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(57) Abstract :
[05] The purpose of this work is to understand if linoleum bers could be useful for some specic aerospace applications. A general exact 3-dimensional shell model is used for the static analysis of the proposed structures to obtain displacements and stresses through the thickness. The shell model is based on a layer-wise approach and the differential equations of equilibrium are solved by means of the exponential matrix method. In qualitative terms, composites including linoleum bers have a mechanical behaviour similar to composites including glass or carbon bers. In terms of stress and displacement values, composites including linoleum bers can be used in aerospace applications with limited loads. They are comparable with composites including glass bers. Such conclusions have been veried for different structure geometries, lamination sequences and thickness ratios. The proposed general exact 3D shell model allows the analysis of different geometries (plates and shells), materials and laminations in a unied manner using the differential equilibrium equations written in general orthogonal curvilinear coordinates. These equations written for spherical shells degenerate in those for cylinders, cylindrical shell panels and plates by means of opportune considerations about the radii of curvature. The proposed shell model allows an exhaustive comparison between different laminated and sandwich composite structures considering the typical zigzag form of displacements and the correct imposition of compatibility conditions for displacements and equilibrium conditions for transverse stresses. Accompanied Drawing [FIG. 1] [FIG. 2] [FIG. 3] [FIG. 4]

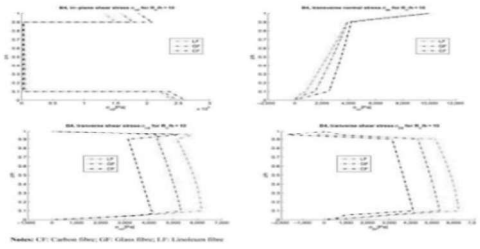

Figure 4 Stress components through the thickness of the sandwich spherical shell embedding composite skins (B4) with Ra/h = 10

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