



Numerical multi-scale modelling of composite plates

By Cécile Eliane Helfen

Shaker Verlag Mrz 2013, 2013. Buch. Condition: Neu. Neuware - Composite plates, such as sandwich structures or hybrid laminates, are widely used in the field of transport industry, due to their outstanding mechanical properties for a relatively reduced weight. However, they show a complex material behaviour, which cannot be properly described by using a simple mixture rule. Moreover, it can be necessary to model non-linear material behaviour -like for instance plasticity- if dealing with a forming process. Due to the restriction of most of the plate theories to linear material behaviour, the development of a numerical multi-scale modelling of composite plates is of interest. In the presented work, the modelling of the mechanical behaviour of composite plates is based on a numerical homogenisation, or so-called FE 2 ,for composite plates. The principle is to split the problem into two characteristic scales: on the one hand, the macroscale, containing the kinematics of the plates, and on the other hand, a so-called mesoscale, discretizing the layers stacking order with their individual properties. In this work, special attention is paid towards the definition of the analytical tangent using the Multi-Level Newton Algorithm (MLNA) and towards the resolution of the Poisson's thickness locking phenomenon, enabling the consideration of the thickness change by an improved projection strategy. The validity of...



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