NUMERICAL BUCKLING ANALYSES OF STIFFENED COMPOSITE PANELS

Nils Wagner, Reinhard Helfrich

INTES GmbH

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ABSTRACT

Nowadays the more widespread use of composite structures demands a better understanding of often complicated mutual interactions between system parameters like ply-angle directions, stacking sequence on the general response behaviour. It is well known that stiffeners attached to (composite) panels might clearly improve the overall buckling behaviour of the resultant stiffened structure.

In this study, a sampling procedure examines the effects of various influencing factors, such as the position and shape of the stiffener, on the buckling behaviour. Besides the stress determination a proof of sufficient stability against buckling is required. Afterwards a meta-model is created based on the results of the sampling procedure. Tailor-made solutions can be provided from the early design stage to their deployment, use and ultimate disposal. It gives us the ability to recommend the best solution from a variety of different realisations. The optimized design often reveals a new shape and position of the stiffener. Thus, the finite element model can be output with actual coordinates.

Virtual prototyping and simulation are key factors in slashing time to market. All computations are carried out in PERMAS. The model completion is assisted by a user-friendly wizard within VisPER (Visual PERMAS). Automating simulation processes yields substantial productivity gains for expert analysts and are less prone to errors.