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Coupling of Axisymmetric and 3D Shell Models for Non Linear Elastoplastic Buckling Prediction of Mainly Axisymmetric Shells

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The axisymetric models are very efficient for prediction of non linear buckling of shells with generalised imperfections or loadings. The approximate the solution is expanded on a finite Fourier basis. This strategy has been extensively used by Wunderlich or Combescure for the analysis of axisymetric imperfect shells subjected to any load. In case of local geometrical imperfection or quickly varying load or local support condition the axisymmetric models are no longer efficient. The usual practice is to use 3D shell model. This method leads to heavy meshes if one desires a good precision. A special interface element is developed to combine a 3D analysis for the region of local strong discontinuity and an axisymetric coupled Fourier analysis for the rest of the structure. The method presented in this paper is developed for elasto plastic non linear buckling and some examples are compared with fully 3D analysis or with experiments.

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