

Università degli Studi di Pavia Computational Mechanics & Advanced Materials Group - DICAr

Progresses in mixed models for the efficient nonlinear analysis of composite shells

In the analysis of slender elastic structures two main advantages are achieved through the mixed (stress and displacement) format with respect to the more commonly used displacement one: (i) the smaller error in the extrapolations usually employed in the solution strategies of nonlinear problems; and (ii) the lower polynomial dependence of the problem equations on the finite element degrees of freedom when solid finite elements are used. The smaller extrapolation error produces a lower number of iterations and larger step length in path-following analysis and a greater accuracy in Koiter asymptotic method.

Stress interpolation is sometimes not simple nor computationally convenient. The relaxation of the constitutive equations at each integration point allows large steps and a low number of iterations in the iterative scheme in order to reconstruct the equilibrium path, even for very slender structures. This strategy makes it possible to minimize the number of stiffness matrix evaluations and decompositions and turns out to be particularly convenient in isogeometric analyses.



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Università della Calabria Dip. di Ingegneria Informatica, Modellistica, Elettronica e Sistemistica December 12th, 16:00 (sharp) Aula MS1, DICAr Via Ferrata, 3 – Pavia