

Keynote Paper

Results for Nonlinear Problems of Structures solved by Carrera Unified Formulation

E. Carrera¹

*Mul2 Group, Department of Mechanical and Aerospace Engineering,
Politecnico di Torino, Torino, Italy*
erasmo.carrera@polito.it

ABSTRACT

This lecture is concerned to the developments of Unified Formulation (Carrera Unified Formulation, CUF) to solve some nonlinear problems, including beams, plates and shells. CUF was originated by laminated multilayered structures analysis, including laminated composites. Enhanced 1D and 2D (beam/plate/shell) formulations are constructed by the condensed CUF notation. The capability of 1D-CUF models to develop component-wise CW approach for the analysis of metallic and composites aerospace wing, fuselage full-aircraft structures is addressed. CW is also applied for accurate evaluation of 3D stress fields in the lamina components (fiber and matrix) and to typical free edge problems and progressive failure analysis PFA of laminates are overviewed. Applications to Nonlinear problems (plasticity, large deflection and post buckling and contact) are overviewed. The use of Global-Local approaches is discussed.

¹ Professor