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Research Details :

Research Title	: *Benchmark trigonometric and 3-D elasticity solutions for an exponentially graded thick rectangular plate* *Benchmark trigonometric and 3-D elasticity solutions for an exponentially graded thick rectangular plate*
Descriptipn	: The bending problem of a transverse load acting on an isotropic inhomogeneous rectangular plate using both two-dimensional (2-D) trigonometric and three-dimensional (3-D) elasticity solutions is considered. In the present 2-D solution, trigonometric terms are used for the displacements in addition to the initial terms of a power series through the thickness. The effects due to transverse shear and normal deformations are both included. The form of the assumed 2-D displacements is simplified by enforcing traction-free boundary conditions at the faces of the plate. No transverse shear correction factors are needed because a correct representation of the transverse shearing strain is given. The plate material is exponentially graded, meaning that Lames coefficients vary exponentially in a given fixed direction (the thickness direction). A wide variety of results for the displacements and stresses of an exponentially graded rectangular plate are presented. The validity of the present 2-D trigonometric solution is demonstrated by comparison with the 3-D elasticity solution. The influence of aspect ratio, side-to-thickness ratio and the exponentially graded parameter on the bending response are investigated.
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