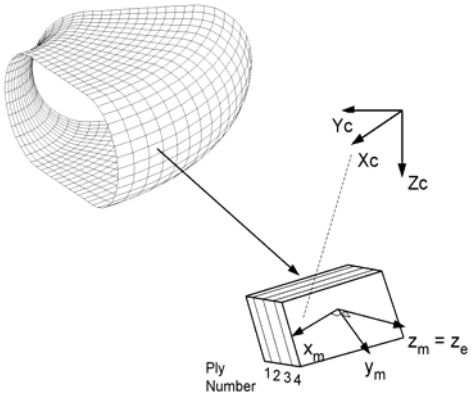
NEiNastran *for Windows*

Composites Support

Description

Today's composite materials often outshine traditional materials; they are lightweight, corrosion-resistant, and strong. Used in everything from aircraft structures to golf clubs, and serving industries from medicine to space exploration, composites are an exciting field of study for students, engineers, and researchers around the world. New applications of these versatile materials are being found daily.



Features

NEiNastran is one of the best finite element analysis software products to model load carrying capabilities of structural plates made of isotropic or composite materials. The important practical benefits are that control of the errors of idealization is made possible and the same finite element mesh can be used for both the structural and strength analyses of plates. Plates can be defined as homogeneous or laminated. If the plate is homogeneous through thickness isotropic or orthotropic material properties may be specified. **NEiNastran** also supports 3D composites using an advanced solid element formulation. Applications include modeling of thin adhesive bond lines, woven composites with through thickness fibers, and 3D orthotropic or anisotropic plates. Sandwich materials are supported using a standard laminate with special face sheet analysis tools to predict local failures such a wrinkling, crimping, and dimpling.

Results

NEiNastran can evaluate composite stresses in a local coordinate system with no limits on the number of plies. Individual ply and laminate maximum/minimum results including failure and stability indexes and strength ratios are available in the **NEiNastran** modeler and optionally in a tabulated text output file. Critical areas can be quickly identified by plotting the maximum failure index and the corresponding ply number using the **NEiNastran** modeler. The following failure theories are supported:

- Hill
- Hoffman
- Tsai-Wu
- NASA LaRC02
- Maximum Stress
- Maximum Strain

Composite Shell Element Results Available

Laminate	Lamina
MAX NORMAL-1	NORMAL-1
MAX NORMAL-2	NORMAL-2
MAX SHEAR-12	SHEAR-12
MAX SHEAR-XZ	SHEAR-XZ
MAX SHEAR-YZ	SHEAR-YZ
MAX PLY FAILURE INDEX	PLY FAILURE INDEX
MAX BOND FAILURE INDEX	BOND FAILURE INDEX
MAX STABILITY FAILURE INDEX	STABILITY FAILURE INDEX
MIN NORMAL-1	STABILITY ALLOWABLE
MIN NORMAL-2	STABILITY ALLOWABLE FAILURE MODE
MIN SHEAR-12	STABILITY INDEX WRINKLING
MIN SHEAR-XZ	STABILITY INDEX DIMPLING
MIN SHEAR-YZ	STABILITY INDEX CRIMPING
MIN PLY FAILURE INDEX	STABILITY ALLOWABLE WRINKLING
MIN BOND FAILURE INDEX	STABILITY ALLOWABLE DIMPLING
MIN STABILITY FAILURE INDEX	STABILITY ALLOWABLE CRIMPING
MAX VON MISES	VON MISES
MAX SHEAR	MAX SHEAR
MAX PRINCIPAL	MAX PRINCIPAL
MIN PRINCIPAL	MIN PRINCIPAL
MAX FAILURE INDEX	PLY FAILURE INDEX MATRIX-TENSION
MAX FAILURE INDEX PLY	PLY FAILURE INDEX MATRIX-COMPRESSION
MIN STABILITY ALLOWABLE	PLY FAILURE FIBER-TENSION
MIN STABILITY ALLOWABLE PLY	PLY FAILURE FIBER-COMPRESSION
MEMBRANE FX	
MEMBRANE FY	
MEMBRANE FXY	
MOMENT MX	
MOMENT MY	
MOMENT MXY	
TRANSVERSE SHEAR QX	
TRANSVERSE SHEAR QY	

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