

NEiNastran

Module NE-L2 (Normal Modes, Buckling, and Prestress)

Overview

This package expands on the capabilities of the basic NE-L1 package with the addition of the buckling, modal, and prestress solution types. As with NE-L1 all material models including composites and element types including 6 DOF/Node CQUADR and CTRIAR and parabolic solid elements are supported.

Capabilities:

Linear Buckling Analysis:

- Critical Buckling Loads and Mode Shapes
- Linear and nonlinear initial stress (requires NE-L4)
- Extremely fast blocked Lanczos and subspace methods
- Solid elements can be used as thin plates with no loss in accuracy

Normal Modes Analysis:

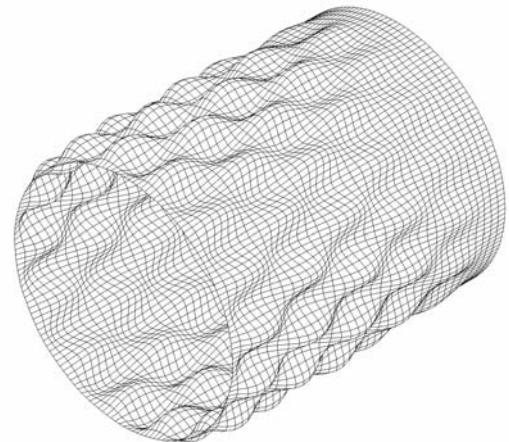
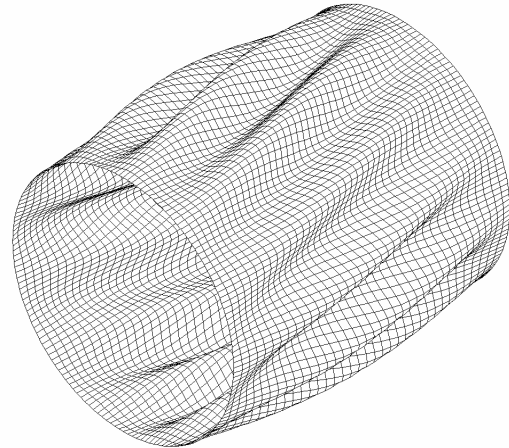
- Natural Frequencies and Mode Shapes
- Flexible and Rigid Body Motion
- Modal Participation Factors
- Modal Effective Mass/Weight (actual values plus percent of total mass, including rotational terms)
- Modal Reaction Forces
- Extremely fast blocked Lanczos and subspace methods
- Iterative mode for Lanczos eigensolver can efficiently handle huge parabolic solid models over 3 million DOF
- Solid elements can be used as thin plates with no loss in accuracy

Prestress Analysis Options are Available for Each Dynamic Solution:

- Linear Prestress
- Nonlinear Prestress (requires NE-L4)

Direct Matrix Input Grid (DMIG) Support:

- Stiffness matrix import and export
- Mass matrix import and export



Model Reduction:

- Craig-Bampton Reduction (Component Modes Synthesis)
- Static condensation
- Guyan Reduction
- Export reduced mass, stiffness, damping, and load matrixes to DMIG or NASTRAN Output 2 (.OP2)
- Residual vectors for improved accuracy
- Automated model reduction tools

Modal Database:

- Allows reuse of Modal Data for further modal response analysis – Frequency response or transient response
- Allows multiple data recovery runs in modal response analysis for maximum results storage efficiency

Modal Set:

- Selective mode usage for modal response analysis using
 - Set of mode numbers
 - Top effective mass count
 - Effective mass threshold

Modal Correlation:

- Modal Assurance Criterion (MAC) output and 3D plots
- Modal Cross-Orthogonality output and 3D plots
- MS Excel Comma Separated Variable (.CSV) and NEiNastran Modal Database (.MDB) input formats
- Automatic interpolation of input data to closest grid

Efficient Solution of Large Models:

- Sparse direct and iterative matrix solvers to handle very large models with minimal processing time
- Parallel processing and I/O for faster performance
- Model reduction methods

Visualization in the Editor

- View extracted frequency and modal effective mass versus mode number
- View 3D MAC plots.

Global Matrix Output:

- Linear stiffness matrix
- Differential stiffness matrix
- Mass matrix

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