

NEi Nastran

Solvers

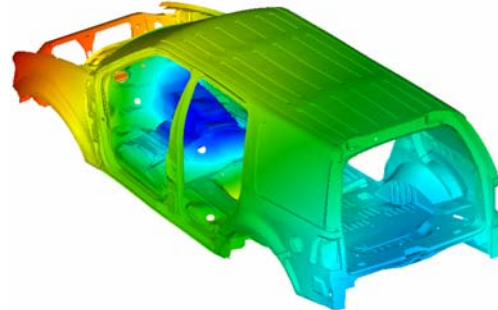
Overview

NEi Nastran uses the latest in solver technology providing fast results for the largest and most complex FEA models. Four linear solvers (PCGLSS, PSS, VSS, and VIS) and two eigensolvers (LANCZOS and SUBSPACE) are included. The PCGLSS (Preconditioned Conjugate Gradient Linear System Solver) is an advanced iterative solver licensed from CA&SI and used in many other leading FEA products. The PSS solver is an extremely fast parallel direct solver and is highly scalable for multi-cpu/core processors. The VSS (Vector Sparse Solver) and VIS (Vector Iterative Solver) are based on NASA developed technology and have been enhanced to provide better performance and accuracy.

Capabilities:

PCGLSS Solver:

- Extremely fast iterative solver capable of handling models over 25 million degrees of freedom on a 64-bit Windows PC
- Multi-mode solver using either an iterative (Preconditioned Conjugate Gradient) or direct solution technique
- The iterative solver mode requires less physical memory and disk storage than direct solver mode
- Automatically selects the most efficient mode of operation based on available resources
- Advanced preconditioner is optimized for all element types
- Available in all linear and nonlinear static solutions
- Supports parallel processing
- Especially effective for large models comprised mainly of parabolic tetrahedron elements (CTETRA)
- User controllable performance and accuracy
- Accuracy measure output
- Supported in all NEi Nastran solutions except direct frequency response
- Windows, Linux, and Unix versions



*SUV Modal Analysis: 1,230,000 DOF.
Total Solution time: 6.8 min. (20 modes) and
17 min. (100 modes). Run on an Intel Core i7
2.8 GHz CPU with 8GB of RAM.*

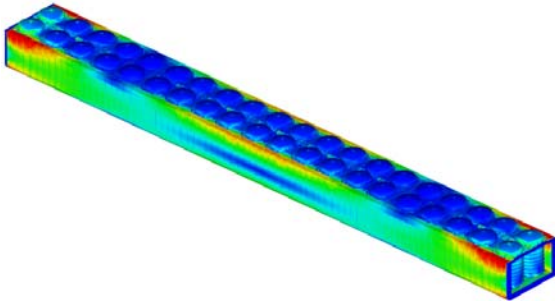
PSS Solver:

- Extremely fast parallel direct solver capable of handling models over 15 million degrees of freedom in 64-bit
- Increased efficiency and performance using supernode techniques with update and pipelining parallelism
- Supernode pivoting ensures numerical stability and scalability during factorization
- Parallel scalability is nearly independent of the shared-memory multiprocessing architecture (performance increases of seven using eight processors have been observed)
- Handles non-positive definite matrixes
- Accuracy measure output
- Supported in all NEi Nastran solutions

VSS Solver:

- Based on NASA Vector Sparse Solver technology
- Handles a wide range of model sizes
- Uses advanced reordering methods automatically selecting the most efficient one
- Handles non-positive definite and ill-conditioned matrixes
- Accuracy measure output

- Supported in all NEi Nastran solutions
- Windows, Linux, and Unix versions

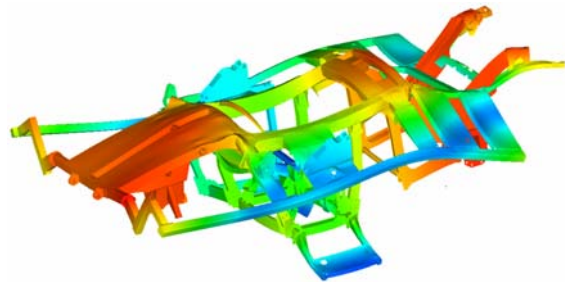


Cargo Ship Linear Static Analysis: 10,963,000 DOF. Total Solution time: 42 minutes. Run on an Intel Core i7 2.8 GHz CPU with 8GB of RAM.

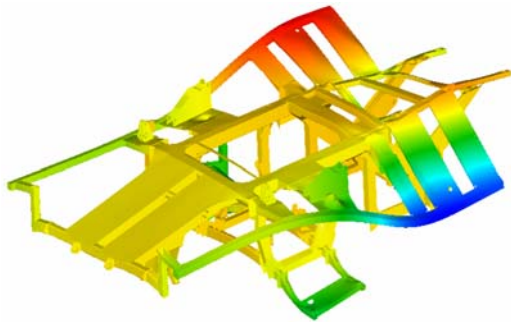
- Automatically selects the most efficient mode of operation based on available resources
- Advanced preconditioner is optimized for all element types
- Available in all modal response solutions including complex eigenvalue analysis
- Supports multiple processors (parallel processing)
- Iterative mode is especially effective for large models comprised mainly of parabolic tetrahedron elements (CTETRA)
- User controllable performance and accuracy
- Accuracy measure output (orthogonality loss and error measure)
- Windows, Linux, and Unix versions

VIS Solver:

- Sparse iterative (Preconditioned Conjugate Gradient) solver
- Extremely robust
- Handles a wide range of model sizes
- Handles non-positive definite, ill-conditioned, and singular matrixes
- Accuracy measure output
- Supported in all NEi Nastran solutions
- Windows, Linux, and Unix versions



Modal Transient Response Analysis of an Automotive Frame: 3,163,596 DOF. Total Solution time: 1.6 hr. (75 modes) and 2.3 hr. (150 modes). Run on an Intel Core i7 2.8 GHz CPU with 8GB of RAM.



Modal Frequency Response Analysis of an Automotive Frame: 3,163,596 DOF. Total Solution time: 1.8 hr. (75 modes) and 2.4 hr. (150 modes). Run on an Intel Core i7 2.8 GHz CPU with 8GB of RAM.

Subspace Eigensolver:

- Subspace eigensolver based on VSS
- Handles a wide range of model sizes
- Available in all modal response solutions including complex eigenvalue analysis
- User controllable performance and accuracy
- Accuracy measure output (orthogonality loss and error measure)
- Windows, Linux, and Unix versions

Lanczos Eigensolver:

- Block Lanczos eigensolver capable of handling models over 15 million degrees of freedom on a 64-bit Windows PC
- Multi-mode eigensolver using either an iterative or direct solution technique

NEi Software, Inc. is aggressively focused on commitment to the customer. Detailed documentation, customized on-site training, and comprehensive technical support ensures that you will see immediate return on your investment.

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NEi Nastran *for Windows*
From NEi Software, Inc.