

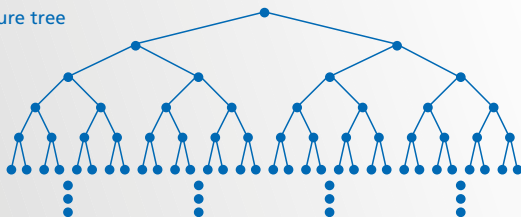


"Impressive Accuracy and Performance to Support Detailed Modeling and High Frequency Analysis"

What is CDH/AMLS?

CDH/AMLS is a revolutionary new software that dramatically reduces the cost of frequency response and eigenvalue analysis for large finite element models. In Automated MultiLevel Substructuring,

Substructure tree



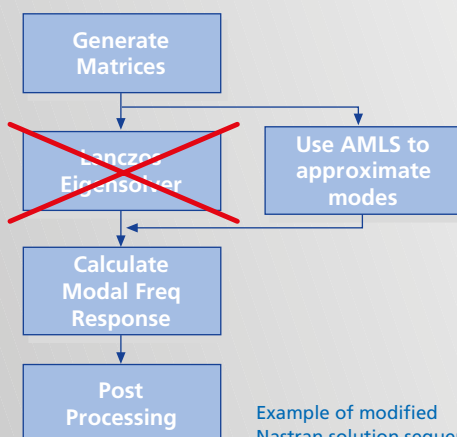
a finite element model with millions of degrees of freedom is automatically divided into about 10,000 substructures arranged in a tree that has about 20 levels. The model is transformed to a very efficient and accurate representation in terms of substructure eigenvectors. This method reduces the analysis burden

greatly by reducing the computation required thus enabling workstations and multiprocessor computing platforms to be used and reducing disk space requirements and job turnaround time.

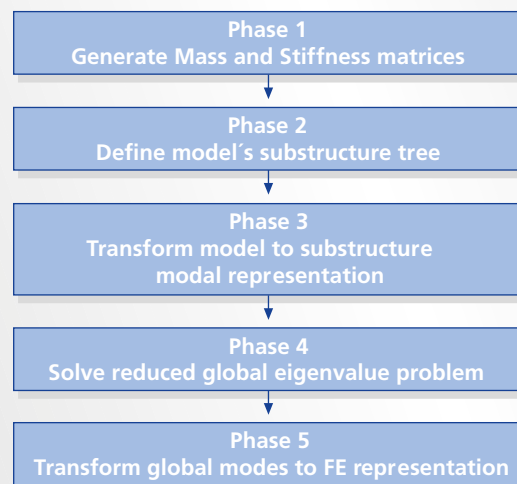
Implementation

CDH/AMLS has been implemented with an interface to MSC.NATRAN, MD NASTRAN, NX NASTRAN and ALTAIR Optistruct software so that it can be used in industrial vibration analysis. CDH/AMLS can be used in normal modes (SOL 103), modal frequency response (SOL 111), modal transient response (SOL 112), and structural optimization (SOL 200) solution sequences. Either use requires a minimum of effort on the part of the user; the user must add only two lines to an input data file to convert a standard

Nastran job into one that uses CDH/AMLS. Once the system matrices have been assembled by Nastran, the Nastran job calls CDH/AMLS software for the compute-intensive portions of the



Example of modified Nastran solution sequence



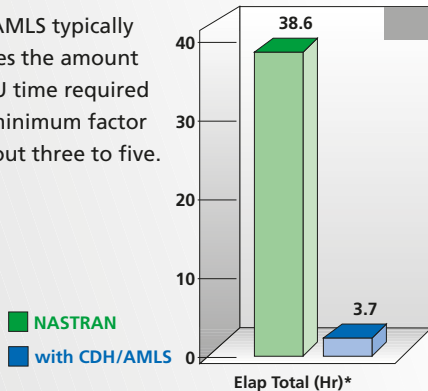
AMLS execution flow

analysis, and results are returned to Nastran for postprocessing if necessary. Alternatively, the analysis may be continued in CDH/VAO, a state-of-the-art interactive dynamics analysis program.

Outrageous Performance

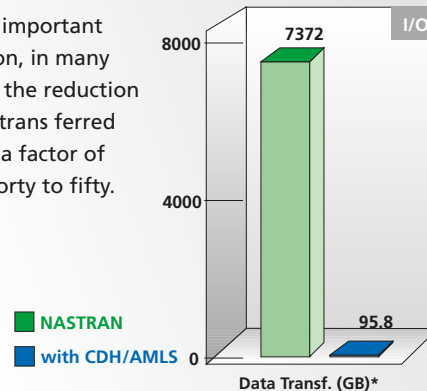
CPU

CDH/AMLS typically reduces the amount of CPU time required by a minimum factor of about three to five.



I/O

A more important reduction, in many cases, is the reduction in data transferred (I/O) by a factor of about forty to fifty.

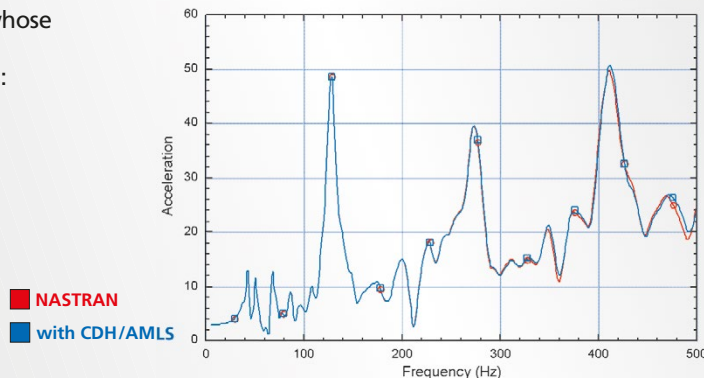


This reduction enables single- and multi-processor engineering workstations and compute servers to handle jobs that previously required very expensive supercomputers. Many users find that jobs that would have taken days in a central job queue without CDH/AMLS can finish in several hours on their own local workstation or department server. *Model Size: 1.4 Mio DOF, Modal Frequency Response Analysis

Accuracy

AMLS produces an approximation whose accuracy is more than adequate for engineering purposes:

- 0-50 Hz: < 0.003% error
- 50-100 Hz: < 0.015% error
- 100-200 Hz: < 0.05% error
- 200-300 Hz: < 0.13% error
- 300-400 Hz: < 0.30% error



Summary

- Comfortable and easy usage
- Compatible to standard Nastran and Optistruct software
- High Accuracy
- Drastic Reduction in computer and hardware cost
- Impressive Performance leads to shorter elapsed time and higher productivity
- Reduction of FE-modeling cost by using one master model for multiple analysis disciplines, e.g. Crash-, Static- and NVH-Analysis
- Make higher frequency range analysis feasible

Software-Hardware Support:

Supported Hardware:
 MSC.NASTRAN
 MD. NASTRAN
 NX NASTRAN
 Altair RADIOSS
 ESI VPS

Supported Hardware:
 Linux64 (x86_64)

MSC.NASTRAN is a proprietary product of MSC Software Corporation.
 MD NASTRAN is a proprietary product of MSC Software Corporation.
 NX NASTRAN is a proprietary product of Siemens Product Lifecycle Management Software Inc.
 Altair RADIOSS is a proprietary product of Altair Engineering, Inc.
 ESI VPS is a proprietary product of the ESI Group

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