

# NX Nastran – Direct Matrix Abstraction Program (DMAP)

Accelerating digital simulation through customizing Nastran for your specific applications requirements and analysis processes

## Benefits

- Capture corporate knowledge by implementing industry (or company) specific procedures based on NX Nastran
- Extend the value of your investment by accessing applications that are not part of the the standard NX Nastran solution sequences, such as rotor dynamic, coupling with mechanical system simulation and integration of test and analysis results
- Accelerate digital simulation work by building customized pre- and post-processing applications tailored around NX Nastran
- Always leverage the latest enhancements to NX Nastran by installing and running updates

## Summary

NX™ Nastran® – Direct Matrix Abstraction Program (DMAP) software is a unique Nastran programming capability available as an add-on to NX Nastran – Basic that allows users to expand NX Nastran capabilities by writing their own applications and installing their own custom modules. DMAP can be used to compute additional measures of structural response; to transfer intermediate data to and from NX Nastran (for example, externally generated system matrices); to incorporate the latest software enhancements without waiting for a major software release; or to access more than just the standard results output sets.

## Customize NX Nastran to meet your specialized needs

With NX Nastran – DMAP, you can modify any existing NX Nastran solution sequence (or even write your own), perform extra analyses or calculations and change the content and format in which output is written or stored in the database. You can also make calls to the hundreds of NX Nastran-provided intrinsic functions and precompiled modules, such as those used for matrix decomposition, eigenanalysis and data recovery and output. And, just as with other scripting languages, you have access to conditional if-then-else logic and looping constructs.

DMAP elements contain data blocks and parameters, and operate on them in a specified manner.

For example, the DMAP statement:

```
Add U1,U2/U3 $
```

adds matrices U1 and U2, and calls the output U3.

The DMAP statement:

```
MATPRN U3// $
```

prints the matrix U3.

NX

## NX Nastran – Direct Matrix Abstraction Program (DMAP)

### Major capabilities

Take advantage of NX Nastran capabilities by operating on intermediate matrices:

- Add, subtract, multiply and transpose
- Solve simultaneous equations (decomposition and forward-backward substitution)
- Merge and partition
- Compute eigenvalues

Integrate NX Nastran with other software programs, and output matrices for use in external programs:

- Finite element post-processors
- Kinematics programs
- Test-analysis correlation programs

Customize NX Nastran for specific applications – write your own custom solution sequences:

- Matrix arithmetic
- Database operation
  - Store to the database
  - Fetch from the database
- Data flow via structured programming
  - If-then-else
  - Jumps, loops

Add functionality to NX Nastran – incorporate DMAPs supplied by Siemens PLM Software or third parties:

- Coupled dynamic analysis
- Cross-orthogonality between test and analysis eigenvalues
- Propeller whirl analysis
- Frequency-dependent impedance
- Dynamic model checkout
- Analysis of rotating structures (including gyroscopic effects)
- Dynamic analysis method of shipboard equipment (DDAM)

Easily correct known problems by incorporating DMAPs supplied by Siemens or by third parties:

- Because the solution sequences are written as a series of DMAP statements, some errors can be corrected by modifying the solution sequences with DMAP statements provided by Siemens.

Contact  
Siemens Industry Software  
Americas +1 800 498 5351  
Europe +44 (0) 1276 702000  
Asia-Pacific +852 2230 3333

[www.siemens.com/plm](http://www.siemens.com/plm)

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