New Features and the MYSTRAN version in which they were added

New Features in Version 13.1 (8/10/2021)

1) Buckling capability was added for the ROD (and CONROD)

New Features in Version 13.0 (7/28/21)

1) Buckling capability was added for all 6 solid elements: HEXA (8 and 20 node), PENTA (6 and 15 node) and TETRA (4 and 10 node)

New Features in Version 12.0

1) A sparse solver, SuperLU was added

New Features in Version 9.00

1) There is now capability for linear buckling and differential stiffness capability but only for models consisting of BAR elements. The capability is the same formulation as was in the original NASTRAN program (using linear differential stiffness)

2) Punch output (written to *filename*.PCH) is now available for all grid related outputs (ACCE, DISP, OLOAD, SPCF, MPCF)

New Features in Version 6.34

1) The Lanczos eigenvalue method has a new algorithm using the TRLan (Thick Restart Lanczos) method. The generalized eigen problem is transformed into a standard format prior to finding the eigenvalues and eigenvectors.

New Features in Version 6.30

1) Tab delimiting allowed in Exec Control and Case Control (in addition to the already tab delimiting in Bulk Data).

2) INCLUDE file feature in Exec Control Case Control and Bulk Data (INCLUDE 'filename')

New Features in Version 6.20

1) New Bulk data USET, USET1, PARVEC, PARVEC1 entries

2) New Exec Control entry PARTN for partitioning OUTPUT4 matrices prior to their being written to disk files

New Features in Version 6.12

1) Enhancements to the format for large field Bulk Data entries to be more compatible with MSC NASTRAN

New Features in Version 6.10

1) The following Bulk Data entries have been added to MYSTRAN:

a) PLOAD4 (currently only for plate elements)

2) Comma Separated Value (CSV) Bulk data entries can now have up to 16 columns of entry

3) Various changes to Exec Control, Case Control and Bulk data that allow more MSC NASTRAN features in specifying inputs for MYSTRAN items.

New Features in Version 6.01

1) The following Bulk Data entries have been added to MYSTRAN:

b) CONROD
c) CORD1R
d) CBUSH, PBUSH
e) CSHEAR, PSHEAR
f) PBARL
g) PLOTEL
h) RSPLINE

2) Large field Bulk Data entries are now allowed

3) Plate material angles can now be specified via a coordinate system ID in addition to specification of an explicit angle

New Features in Version 5.30

1) Bulk Data entries can have either tab or comma delimited fields (but not both in one record)

2) Enhancements to Craig-Bampton analyses:

a) the 6x6 RBM0 rigid body mass matrix is generated internally in the synthesis run

b) Grid Point Weight Generator (PARAM GRDPNT) is run for all CUSERIN substructures, the residual structure, and the overall model

New Features in Version 5.24

1) For very large problems a significant improvement in performance has been made relative to that experienced in versions 5.xx prior to this version.

New Features in Version 5.20

1) RBE3 element added

New Features in Version 5.10

1) Corner stresses for QUAD4 and QUAD4K elements in addition to element center stresses

New Features in Version 5.00

1) Scalar points (SPOINT)

2) CELAS2,3,4 scalar elastic elements in addition to existing CELAS1

3) CMASS1,2,3,4 scalar mass elements

4) SLOAD for loads on scalar points (SPOINT's)

5) CUSERIN element for allowing user to input stiffness and mass matrices via binary files in NASTRAN INPUTT4 format. One of the uses of this is in Craig-Bampton models synthesis into a system model (see MYSTRAN Demonstration Problem manual for an example). It can also be used for other purposes where the user has a stiffness and mass matrix for a portion of their structure which can't be modelled with normal MYSTRAN elements.

New Features in Version 4.05 (Apr 14, 2007)

1) Grid Point Force Balance now has effects of inertia forces and Craig-Bampton boundary forces. Grid forces now should all sum to zero

New Features in Version 4.02 (Dec 15, 2006)

1) PCOMP for layered composite plate/shell elements (now for unsymmetric as well as symmetric layups)

2) Problems in which the complete displacement vector (all G-set displacements and rotations) is known (e.g. from test data) can be run to get other outputs (stresses, etc) using the Case Control commands:

ENFORCED = filename

where filename is a text file with the grid numbers and displacements (Grid ID, T1, T2, T3, R1, R2, R3) in a text file in CSV (comma separated value) format. The first record is a comment line followed by one line for each grid with the above data. All grids must be specified and the Bulk Data cannot contain any constraints. Any constraints (SPC or MPC requested in Case Control will result in an error as will any Bulk Data ASET or OMIT entries.

New Features in Version 4.00 (Dec 15, 2006)

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1) PCOMP for layered composite plate/shell elements (currently only for symmetric layups, unsymm in next release)

2) Craig-Bampton model generation (see users manual for a full discussion)

New Features in Version 3.00

1) 3D solid elements:
HEXA 8 and 20 node
PENTA 6 and 15 node
TETRA 4 and 10 node

2) FEMAP interface for users with the FEMAP pre/post processor. Use Bulk Data entry:

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PARAM  POST  -1
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For post processing of data select filename.NEU to be processed by FEMAP (where filename = name of input data deck)

3) Grid point force balance can be requested in Case Control with GPFORCE = SID for SOL 3 (eigenvalue analysis) with the following caveats:

a) effects of inertia on SPC and MPC forces are included

b) No inertia force at a grid is calculated (code being currently written) so view the TOTALS as being the negative of the grid inertia force

New features in Version 2.09

1) RFORCE Bulk Data entry added

New features in Version 2.06

1) New QUAD4 element that corrects the deficiency in the prior QUAD4 that had diminished accuracy for elements that were not rectangular

New features in Version 2.05

1) For Case Control SPCFORCES = ALL output values only for grids that have a displacement component in the S-set

New features in Version 2.03

1) Faster recovery of forces of single point constraint (avoiding a matrix transposition which is compute intensive)

2) Option for using nonsymmetric sparse storage of matrices (PARAM SPARSTOR). This uses more disk storage but can greatly reduce the compute time for matrix partitioning.

New features in Version 2.00

1) Plate elements can have orthotropic material properties (MAT8 entry).

2) An AUTOSPC feature, under user control, has been added. This is an important feature for large problems where the user has difficulty determining what the singularities may be. The MYSTRAN AUTOSPC can output the forces of constraint specifically on the AUTOSPC'd degrees of freedom (DOF's) separately from the regular SPC force output. These constraint forces on the AUTOSPC'd DOF's should be reviewed to make sure that they are insignificant.

3) An automatic grid point resequencer has been added which will reorder the grid sequence in a fashion to minimize the bandwidth of the G-set stiffness matrix. This is extremely important as the storage for the stiffness matrix is directly dependent on its bandwidth. In addition, the time for the decomposition of the stiffness matrix during the solution process increases significantly with matrix bandwidth.

4) Several eigenvalue extraction techniques have been added to Version 2.00:

a) Lanczos. This has been used by the author to solve for the 1st 200 eigenvalues and eigenvectors of an approximately 40,000 DOF A-set system. This was for a real live problem, not academic.

b) Modified Givens (MGIV)

c) An Inverse Power (INV) for the 1st mode only

5) Calculation of modal participation factors and modal effective mass for models in eigenvalue analyses (relative to the SPC constraint set).

6) A stiffness matrix equilibrium check upon user request