HOW TO USE 'SET' COMMAND IN MSC NASTRAN

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Date:29.12.2021

WHAT IS SET?

- SETs are used to define a list of identification numbers (node, element, or superelement).

- These lists could be used to :

    - Request output for specific parts (nodes/elements) of a model.

    - Define frequencies for output in frequency response problems, or times in transient response.

    - Define surface or volume in OUTPUT(POST) commands. (For example, .mnf export in SOL 103)

EXAMPLE MODEL DESCRIPTION FOR SET COMMAND

- This is an example model of cantilever beam meshed with Tet10 elements.

- Aluminum properties are assigned.
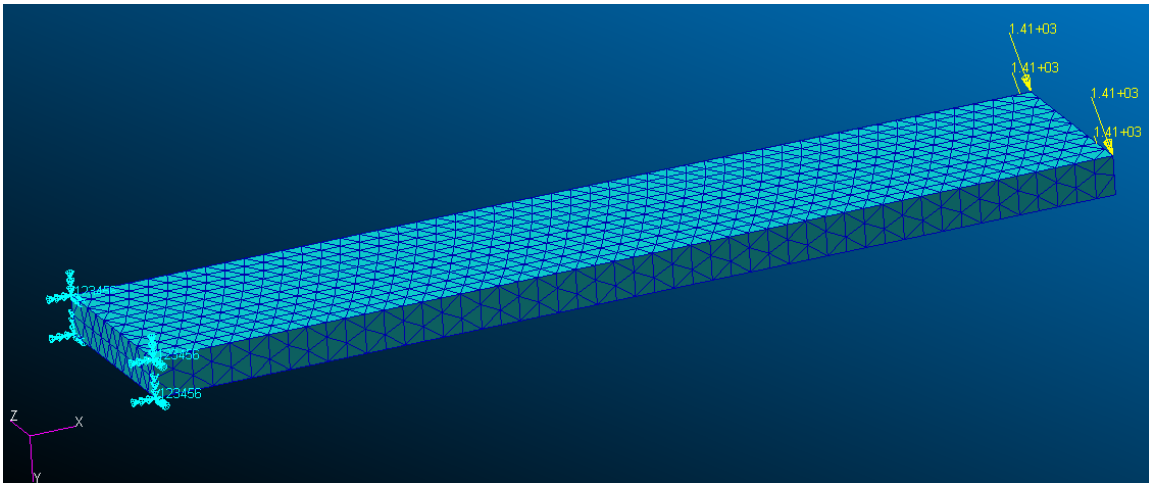

Creating a Group for SETS

- Groups with nodes and elements are used to create sets.
- A group is created for this example. Number of elements and nodes in that group can be seen on the table.

	Number of	
	Elements	Nodes
All Model	6350	11065
Set	271	566
%	**4.27**	**5.12**
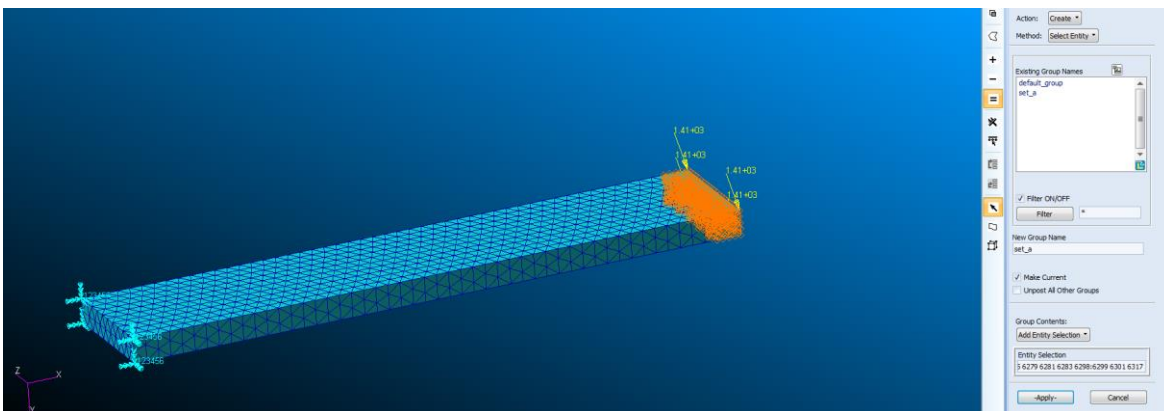
Requesting Outputs (Assigning SETs)

- Created groups can be assigned to an output. This tool creates 2 sets for the created group (one for nodes, one for elements) and uses an according set for the output request. For example, if Group A is assigned to GPFORCE output, the set that contains the nodes of Group A is assigned to GPFORCE. If Group A is assigned to STRESS output, the set that contains the elements of Group A is assigned to STRESS output.
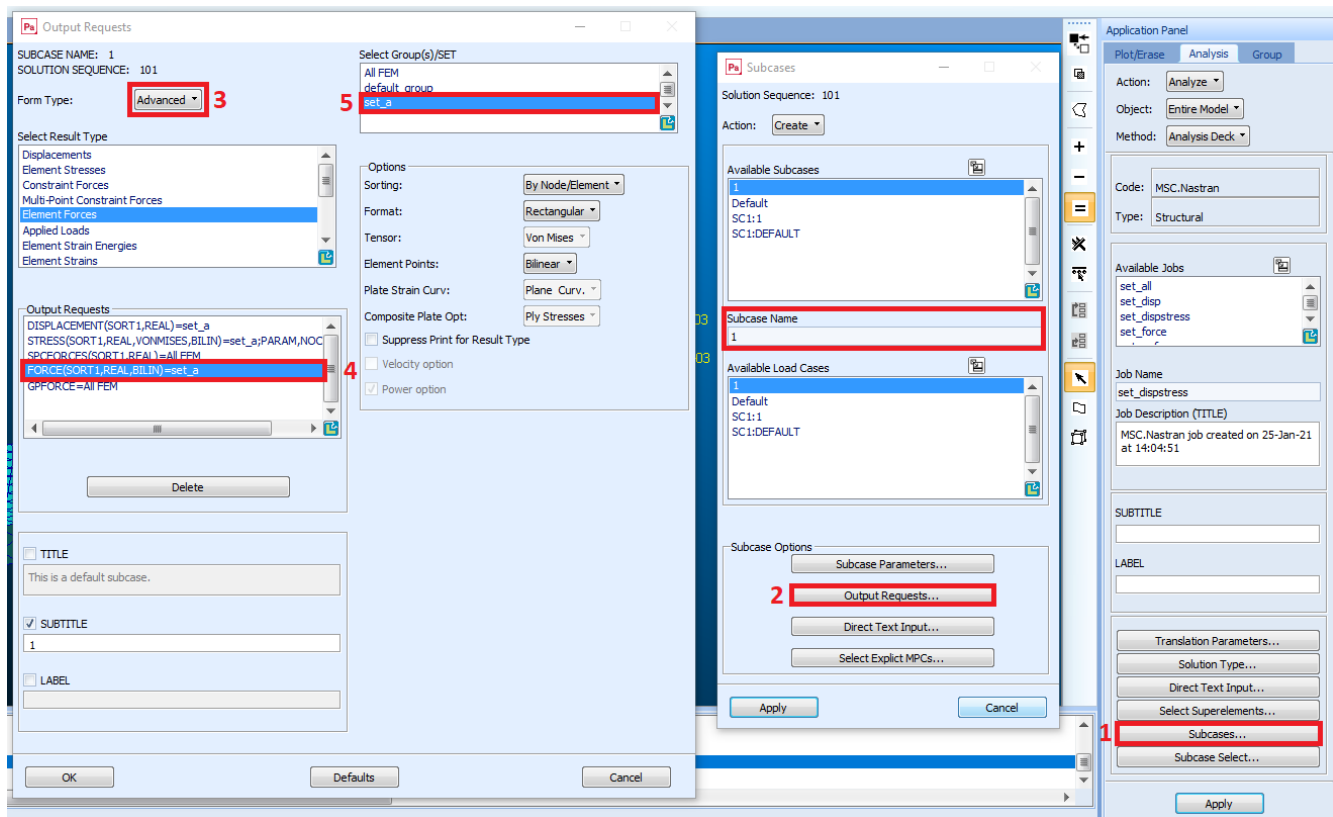
SET Command in a BDF file

- This is how SET command looks when you get an bdf export from Patran.

```
$ Linear Static Analysis, Database
SOL 101
CEND
$ Direct Text Input for Global Case Control Data
$ Elements (and connectors) for group : set_a
SET 1 = 9,10,77,79,88,91,92,99 THRU 103,187 THRU 195,199,437,461,477,
486,689 THRU 695,830,831,833 THRU 840,855,864,866,868,876 THRU 880,882,
888,1059,1063,1094 THRU 1098,1419,1420,1421,1422,1445,1466,1530,
1531 THRU 1537,1641,1645,1646,1648,1649,1650,1676,1723,1743,1744,1751,
1755,1758,1768,1771,1923,1931,1932,1934,1935,1937,1939,1940,1943,1945,
2005,2006,2011,2012,2013,2014,2356,2368,2369,2372,2375,2435,2439,2454
$ Nodes for group : set_a
SET 2 = 7,112,113,190,230,350,351,352,404 THRU 408,413 THRU 417,419,485,
486,489,491,520,521,523,532 THRU 540,775,782,783,784,804,805,806,813,
814 THRU 823,844 THRU 863,1128,1133 THRU 1157,1163,1164,1165,1168,1169,
1218,1221,1873,1874,1923 THRU 1928,1971,1994,1995,2227,2228,2229,2580,
2581 THRU 2598,2913 THRU 2921,2923 THRU 2938,2977,2978,2979,3005
ECHO = NONE
SUBCASE 1
    SUBTITLE=1
    SPC = 2
    LOAD = 16
    DISPLACEMENT(SORT1,REAL)=2
    GPFORCE=2
    STRESS(SORT1,REAL,VONMISES,BILIN)=1
    FORCE(SORT1,REAL,BILIN)=1
$ Direct Text Input for this Subcase
BEGIN BULK
```

Effect of SET Command on Output Size

- On the table below, how size of the outputs changes with SET command is shown . This table is created using the model on Slide 3 with the given set size.

- Each output is requested separately and their .h5 size is shared below.

Output Request	.h5 size (kb)		
	Without set	With set	% Difference
DISPLACEMENT	2729	2091	-23.4
GPFORCE	7897	2347	-70.3
STRESS	4023	2132	-47.0
ALL of above	10537	2527	-76.0
NONE*	1915		-

*NONE shows the size of .h5 output without any output request.

Example Fringe Result with Assigned SET

- Von Mises stress result for the example SET of the model can be seen below.

- Black part shown as 'out of range' refers to model part where output is not requested.