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Innovative Solutions Through Test and Analysis-Driven Design


Prepared for:

What's New in Femap 11.3 Webinar

Date:


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Outline

1. Introduction
2. Visualization Example
3. Contact Example
4. Mesh Refinement Example
5. Postprocessing Example
6. Solver Support Updates
7. Question and Answer Session

Introduction

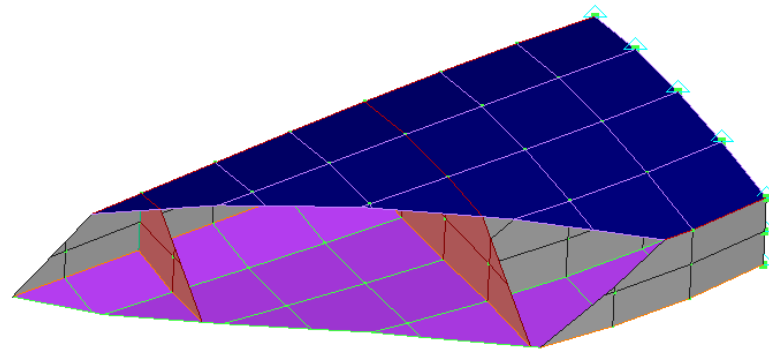
- v11.3 release scheduled to happen by the end of April
 - Look for the email
 - Download on Siemens GTAC website

- Femap Direction
 - Dedicated FEA environment
 - Detailed functionality to accurately model real-world problems
 - Customer driven features and functionality

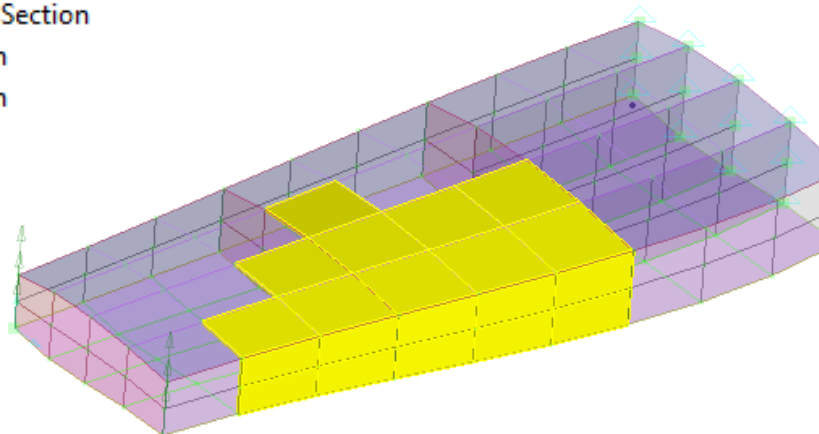
Visualization Example

Wingpost Part 1

- Draw/Erase Toolbar
- Pick Front
- Roll Thru
- Properties



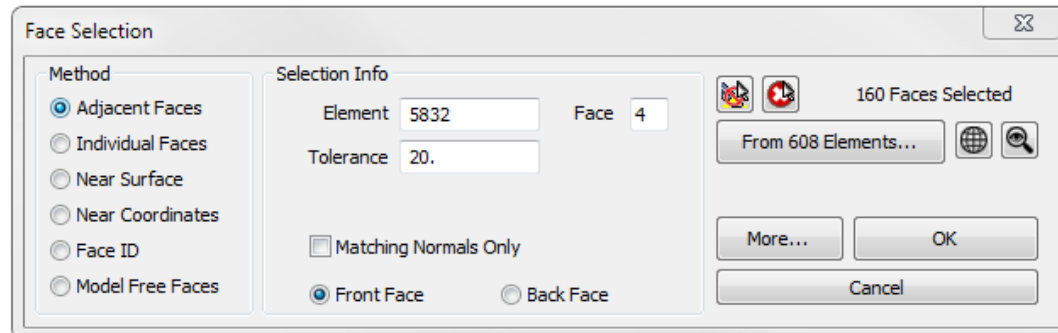
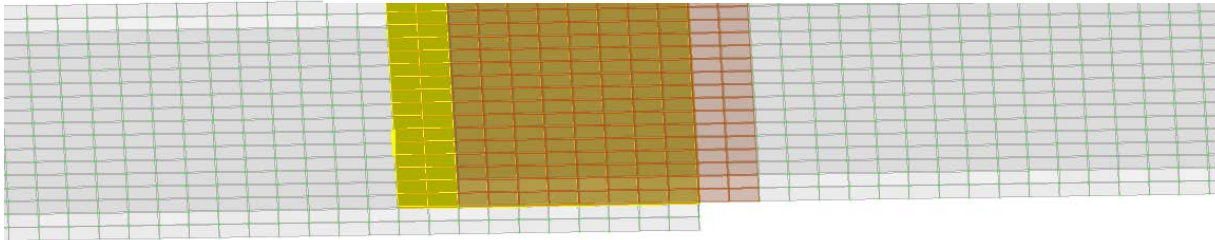
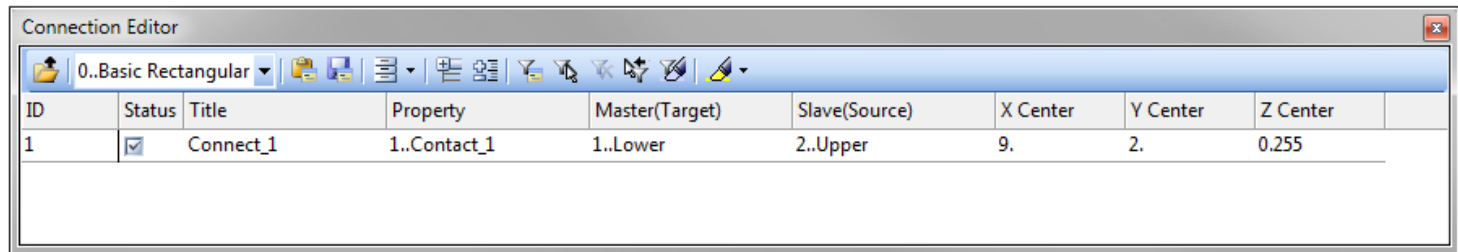
- Properties**
- L 1..Upper Angle Stiffener
 - L 2..Lower Angle Stiffener
 - L 3..Rib to Spar Angle Stiffener
 - T 4..Lower Stringer - T Section
 - T 5..Upper Stringer - T Section
 - 101..Upper Wing Skin
 - 102..Lower Wing Skin
 - 103..Ribs
 - 104..Spar Webs



- Smart Snap
- Snap to Screen
- Snap to Grid
- Snap to Point
- Snap to Node
- Pick Normal
- Pick Query
- Pick Front
- Pick Any Inside
- Pick All Inside
- Select ▶
- Rotate View... ▶

Contact Example

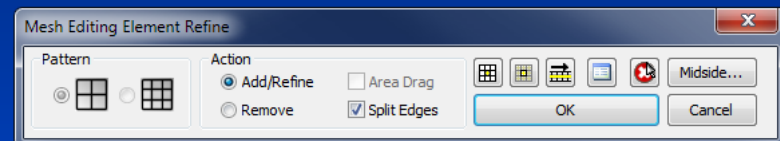
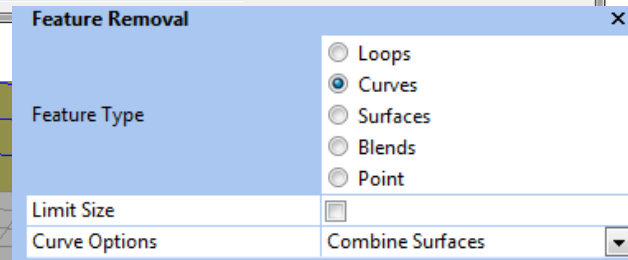
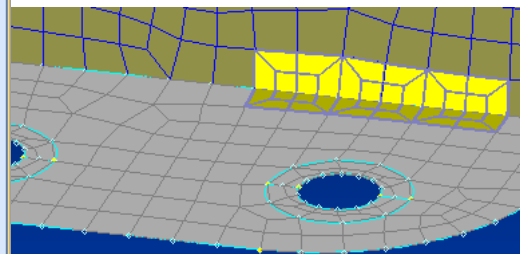
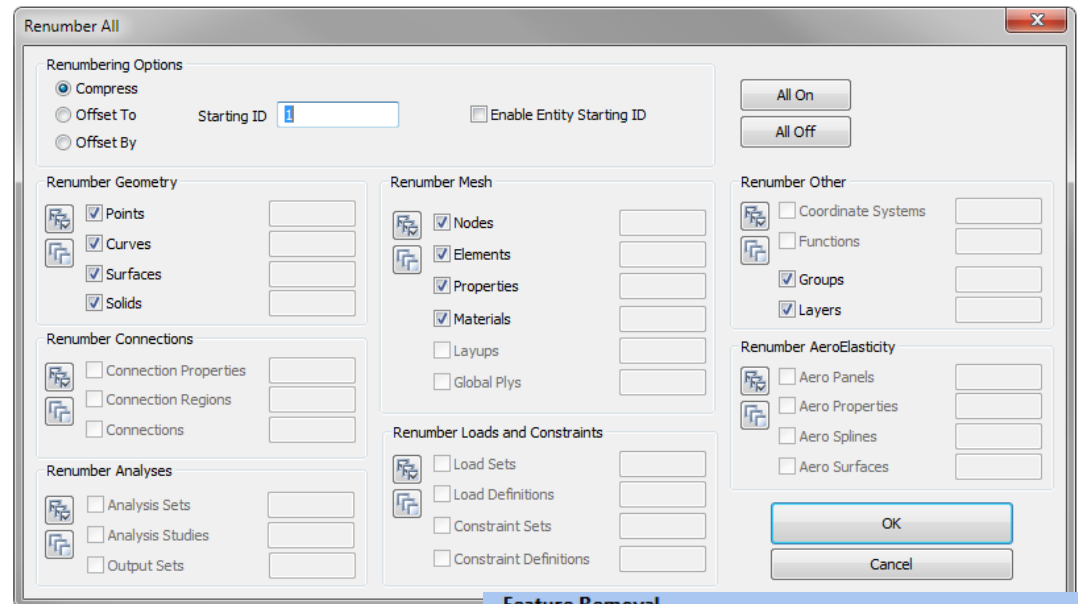
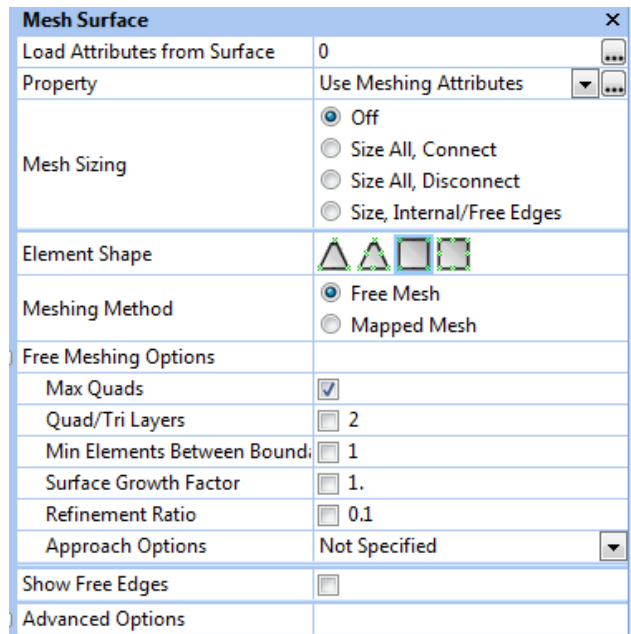
- Connection Manager
- Element Face Picking



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Mesh Refinement Example

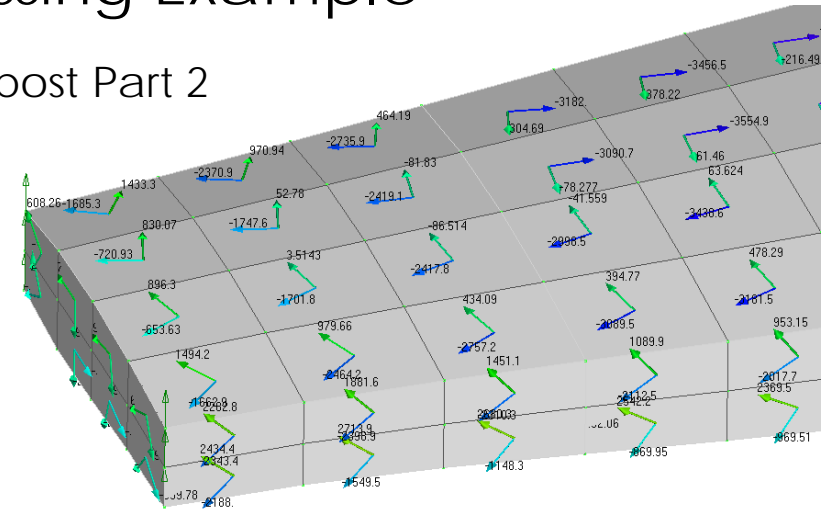
- Max Quads
- Internal Element Growth
- Feature Removal
- Renumber All



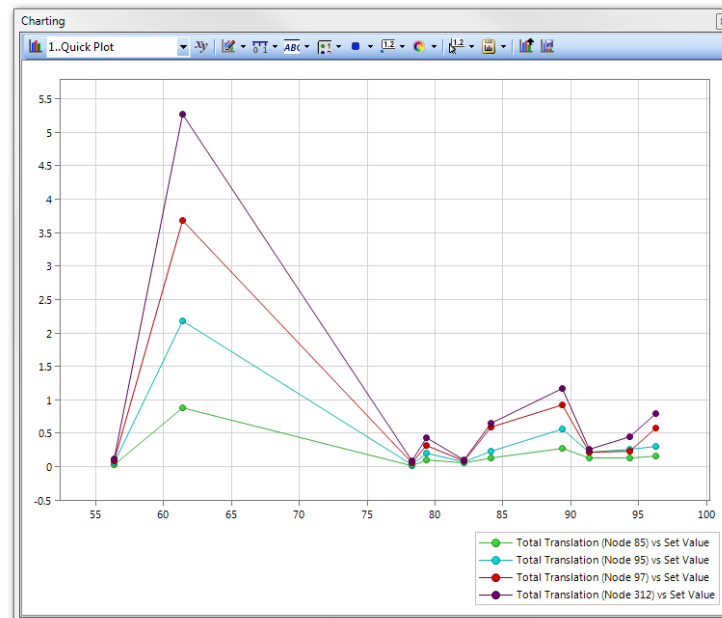
Postprocessing Example

Wingpost Part 2

- Contour Arrows
- Output Set Titles
- Charting Analysis Studies



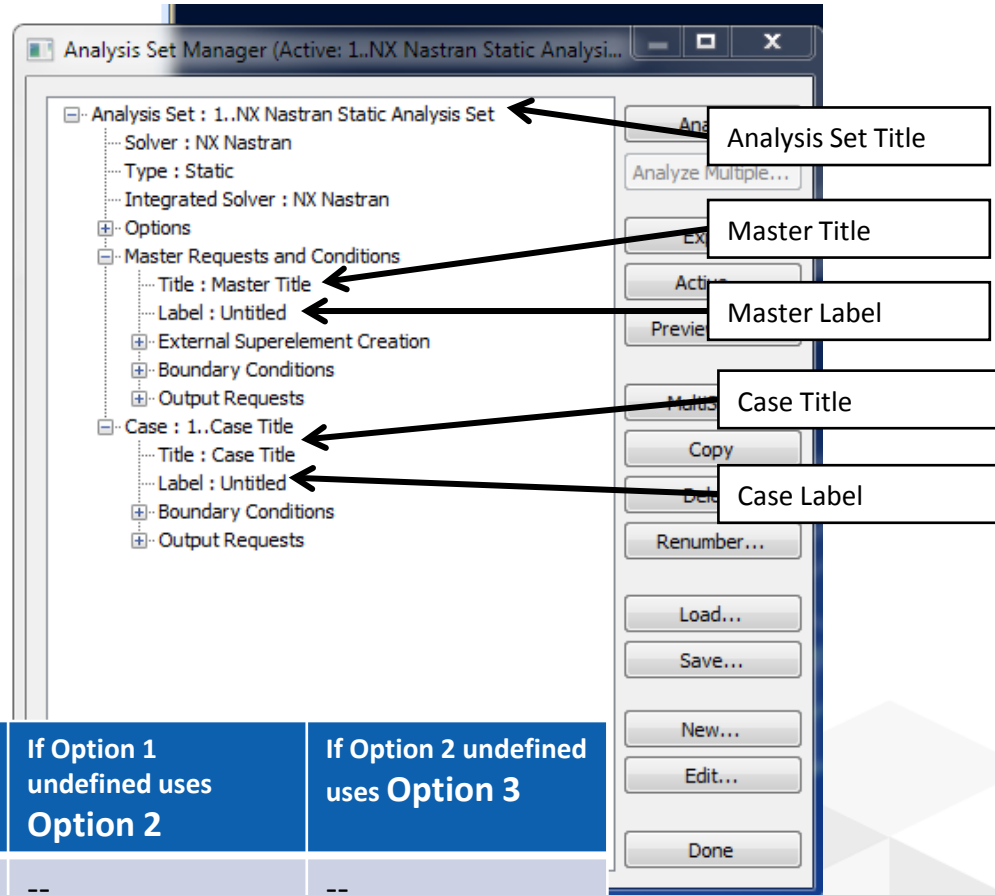
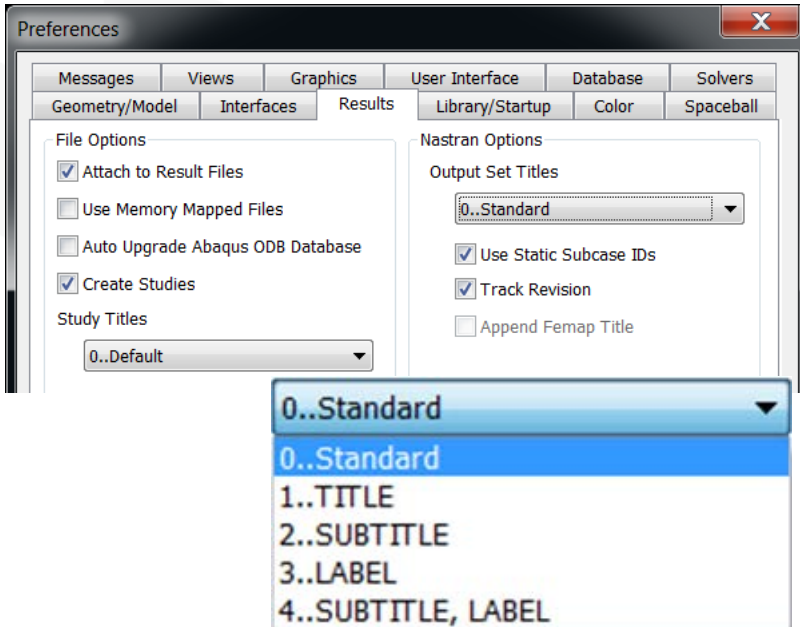
Element...	7026..Plate Top MajorPrn Stress	7027..Plate Top MinorPrn Stress
100	-1247.733	-5708.224
103	-1197.979	-5455.101
97	-932.6013	-5269.575
106	-833.1339	-4868.402
101	-309.2333	-4764.263
104	-328.9654	-4586.746
88	-545.8931	-4083.238
102	-505.8874	-4051.597
98	117.9048	-3949.435
105	-509.0112	-3912.452
91	-546.6316	-3902.092
85	-216.4921	-3856.371
99	-219.4901	-3836.535
89	61.45992	-3554.92
94	-194.0677	-3552.684
108	-201.3204	-3551.229
86	378.2191	-3456.518
92	63.62388	-3438.628
107	124.7053	-3432.037
87	304.6888	-3182.041
95	478.295	-3181.51
90	-78.27747	-3090.708
96	394.7728	-3089.455
273	-99.45749	-3026.931
93	-41.55893	-2998.457



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Postprocessing

Results Titles

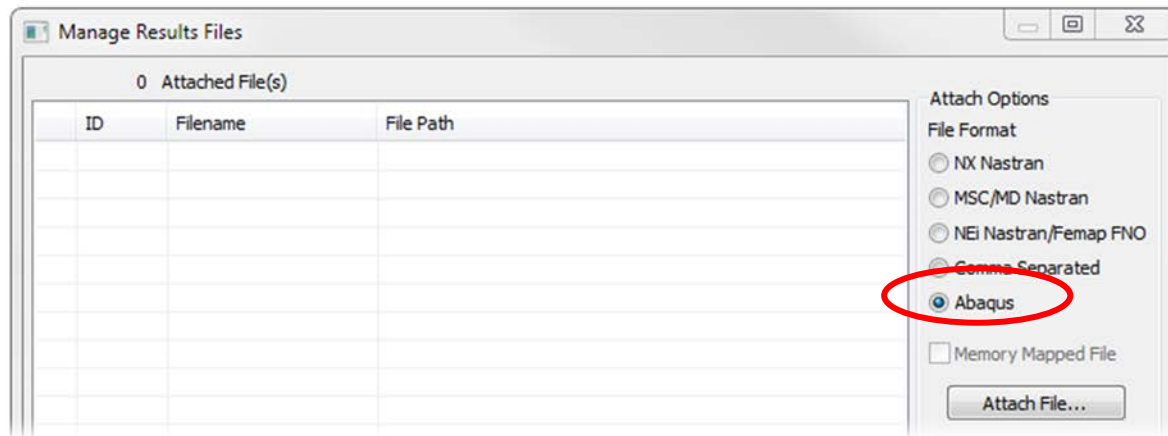


	Option 1	If Option 1 undefined uses Option 2	If Option 2 undefined uses Option 3
TITLE	Analysis Set Title	--	--
SUBTITLE	Case Title	Master Title	"Unknown"
LABEL	Case Label	Master Label	"Unknown"

Solver Support

Abaqus ODB Files

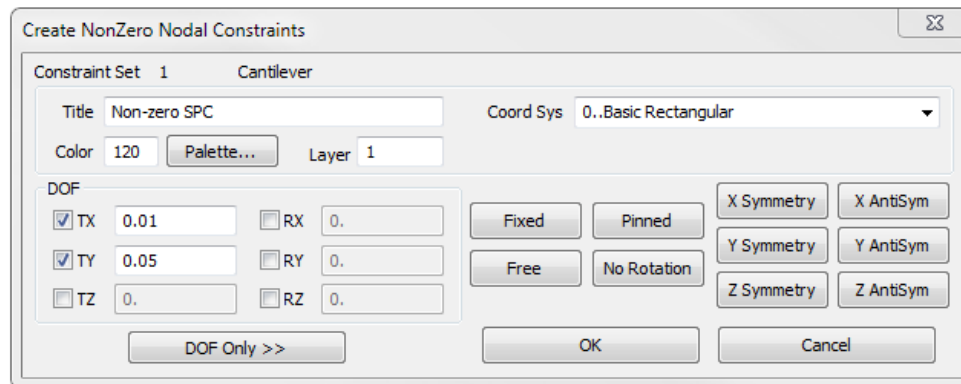
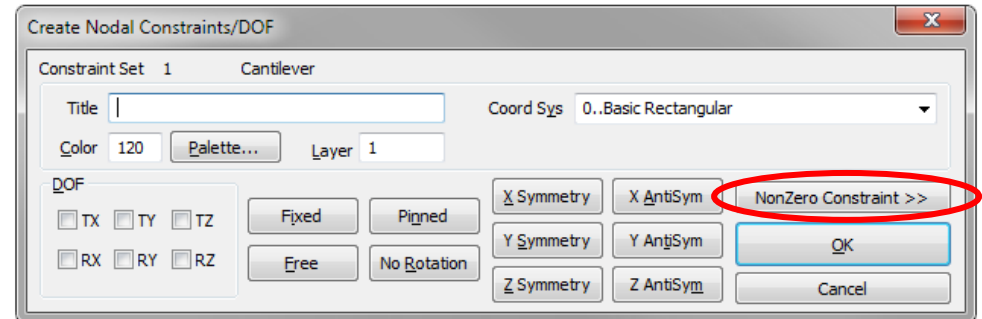
- First time support of the ODB file
- Attach to Abaqus results
 - Internalize selected results
- Supports prior version ODB
- Works like currently supported results formats including Nastran OP2 and XDB, CSV, and Femap FNO
- Fully compatible with all postprocessing functionality



Solver Support

Non-zero Constraints

- Non-zero Constraints aka Enforced Displacement
- SPC in constraint set



\$ Femap with NX Nastran Constraint Set 2 : Enforced Displacement

SPC	2	103	1	.01
SPC	2	103	2	.05

Solver Support

NX Nastran Solution Control

- Additional command line access
- Default from file → preferences
- Additional GPU control
 - More options as they become available

The screenshot shows the 'NASTRAN Executive and Solution Options' dialog box. Key settings are highlighted with red circles:

- Additional Command Line:** SMEM=10GB parallel=4
- GPU Computing:** Checked, set to 1..DCMP
- Iterative Solver:** 0..Off
- Number of Processors:** 4
- Solver Memory (Mb 0=Auto):** 0

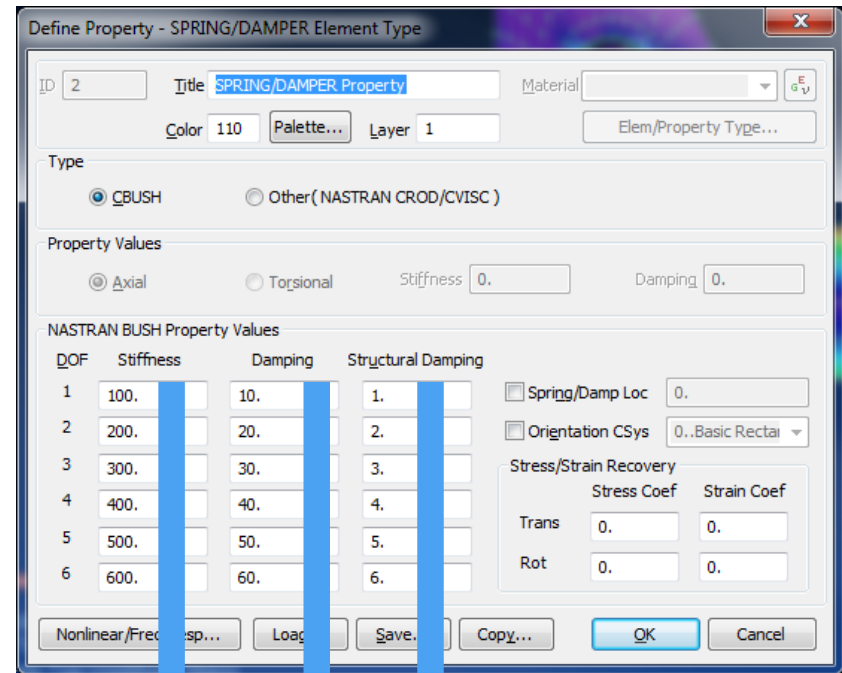
Other visible settings include:

- Direct Output To:** (empty field)
- Base Filename for Analyze (Blank to Match Model):** (empty field)
- Executive Control:** Problem ID, Solution Override, Max Time (10000), Diagnostics, System Cells.
- MSC/MD Nastran Version:** Ver 2001 (selected), Ver 2004 or later, Previous Versions.
- Restart Control:** Save Databases for Restart, Restart Previous Analysis, Read Only Restart (checked), From, Version, Starting Subcase.
- Manual Control:** Skip Standard Executive Control, Start Text (Off), End / DMAP Text (Off).

Solver Support

CBUSH/PBUSH in ANSYS and ABAQUS

- No matching element in ANSYS and Abaqus
- Helps when transferring models from Nastran
- Calculates stiffness and damping entries according to the CBUSH/PBUSH input
- Uses a general stiffness matrix
 - MATRIX27 in ANSYS
 - *MATRIX INPUT in Abaqus
- Creates spring (K) and/or damper (B) elements
- Matrix is calculated once at export, so nonlinearity and frequency dependencies are ignored



K

B

Solver Support

New Element Types

➤ General Matrix

- 12x12 matrix (K,B,or M)
- Added primarily for CBUSH/PBUSH support in ANSYS and Abaqus

Define Property - GENERAL MATRIX Element Type

ID: 9 Title: GENERAL MATRIX Property Color: 110 Palette... Layer: 1 Elem/Property Type...

Coordinate System for Matrix: 0..Basic Rectangular Matrix Type: 0..Stiffness 6 x 6 Matrix...

Matrix Values

1	2	3	4	5	6	7	8	9	10	11	12
100.	0.	0.	0.	0.	0.934779	-100.	0.	0.	0.	0.	0.934779
	200.	0.	0.	0.	-49.96504	0.	-200.	0.	0.	0.	-49.96504
		300.	-2.804336	74.94756	0.	0.	0.	-300.	-2.804336	74.94756	0.
			400.0262	-0.700594	0.	0.	0.	2.804336	-399.9738	-0.700594	0.
				518.7238	0.	0.	0.	-74.94756	-0.700594	-481.2762	0.
					612.4913	-0.934779	49.96504	0.	0.	0.	-587.5087
						100.	0.	0.	0.	0.	-0.934779
		symmetric					200.	0.	0.	0.	49.96504
								300.	2.804336	-74.94756	0.
									400.0262	-0.700594	0.
										518.7238	0.
											612.4913

Load... Save... Copy... OK Cancel

Solver Support

New Element Types

- Spring to Ground
 - CBUSH or DOF Spring elements
 - For zero length or grounded elements, CID must be specified

Define Property - SPRING/DAMP->GROUND Element Type

ID: 9 Title: CBUSH to Ground Material: [Dropdown] G_v

Color: 110 Palette... Layer: 1 Elem/Property Type...

NASTRAN BUSH Property Values

DOF	Stiffness	Damping	Structural	Spring/Damp Loc	Orientation CSys
1	15000000.	0.	0.	0.	0..Basic Rectal
2	1000000.	0.	0.		
3	1000000.	0.	0.		
4	0.	0.	0.		
5	0.	0.	0.		
6	0.	0.	0.		

Stress/Strain Recovery

	Stress Coef	Strain Coef
Trans	0.	0.
Rot	0.	0.

Buttons: Nonlinear/Freq Resp... Load... Save... Copy... OK Cancel

Element / Property Type

Parabolic Elements

Line Elements

- Rod
- Tube
- Curved Tube
- Bar
- Beam
- Link
- Curved Beam
- Spring/Damper
- DOF Spring
- Gap
- Plot Only

Plane Elements

- Shear Panel
- Membrane
- Bending Only
- Plate
- Laminate
- Plane Strain
- Axisymmetric Shell
- Plot Only

Volume Elements

- Axisymmetric
- Solid
- Solid Laminate

Other Elements

- Mass
- Mass Matrix
- Spring/Damper to Ground
- DOF Spring to Ground
- Rigid
- General Matrix
- Slide Line
- Weld/Fastener

Formulation... OK Cancel

	< 1	>> 2	<< 3	>> 4	<< 5	>> 6	<< 7	>> 8	<< 9	>> 10	>
CBUSH	13199	9	7089							0	
CBUSH	13200	9	8810							0	
CBUSH	13201	9	10531							0	
CBUSH	13202	9	12252							0	
CBUSH	13203	9	13973							0	
CBUSH	13204	9	2483							0	
CBUSH	13205	9	3647							0	
CBUSH	13207	10	5368							0	

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