

Monitoring and Debugging Nonlinear Results

On the Fly output of Displacement Results

- For nonlinear static (both small and large displacement) and nonlinear transient analysis, the displacement results are written to an .h3d file at each iteration or increment
 - The name of the .h3d file is filename_nl.h3d
- These results can be viewed in HyperView as the job is running to monitor the solution process
- To request this output from every SUBCASE at each load increment and at each iteration, use PARAM,NLMON,DISP

On the Fly output of Displacement Results

- To request this output from a specific SUBCASE at each load increment or at each iteration, use NLMON=SID in the SUBCASE and the bulk data NLMON data:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
NLMON	MONID	ITEM	INT						
Field	Contents								
MONID	Nonlinear Monitoring Entry ID No default (Integer > 0)								
ITEM	Specifies the type of results being monitored. DISP: indicates that the displacement results are being output and monitored. NO: indicates that monitoring is not active. No default (DISP or NO)								
INT	Determines the result monitoring intervals. INC: outputs and monitors the final result of every increment. ITER: outputs and monitors the result of every iteration of every increment. No default (INC or ITER) see Comment 3								

On the Fly output of Displacement Results

- If both PARAM,NLMON and NLMON in a subcase are used, the PARAM,NLMON request only applies to SUBCASE that do not have NLMON data

Monitoring and Debugging Results

- You can choose from:
 - Monitoring Results (INT field on NLMON bulk entry is set to INC)
 - Debugging Results (INT field on NLMON bulk entry is set to ITER or PARAM,NLMON,DISP is used)

Monitoring Results in HyperView (INT field is set to INC)

- If the INT field on NLMON bulk data entry is set to INC, you can monitor the progression of the model during the run by following the steps below:
 - Open HyperView and load the <filename>_nl.h3d file result file.
 - You will see the Displacement results in HyperView until the point at which the model has run.
 - In this way, you can monitor the deformation of the model during runtime.

Debugging the Results in HyperView (INT field is set to ITER)

- If the INT field of the NLMON Bulk Data Entry is set to ITER, you can generate results and diagnostic data for each iteration of the nonlinear run.
- Diagnostic data for debugging purposes such as Max Residual Force for LGDISP analysis can be viewed with a HyperView script to parse the data to highlight the problematic nodes. The procedure is as follows:
 - Open HyperView and load the <filename>_nl.h3d file result file. You will see the model results in HyperView at this point.
 - Import the TCL script. The script is located in the installation at:
`<install_directory>/altair/hwsolvers/scripts/os_out_file_parser.tcl`
 - Click File > Run > Tcl/Tk Script and select the os_out_file_parser.tcl script and click Open.
 - In the subsequent OptiStruct OUT File Parser window, select <filename>.out from your working directory for the OUT file: field.

Debugging the Results in HyperView (INT field is set to ITER)

- Click Open and the debugging results for each iteration are now loaded into the Window, as shown below:

Optistruct OUT File Parser

Select Out File:
Out File: C:\Users\rajv\Documents\All Files\Folder_Opt\Struct\Documentation\14.0.230\Projects\Results on the fly (monkroing)\models\channel_section_b...

Section Cuts:
Show Section Cut for: mpe

Show highest occurrences:

- MAX PENETRATION ERROR (MPE)
- MAX PRESSURE ERROR (MPE)
- MAX FORCE (MFO)
- MAX RESIDUAL FORCE (MRF)
- MAX DISPLACEMENT INCREMENT (MDI)
- MAX DISPLACEMENT CORRECTION (mdc)
- MAX MOMENT LIMIT
- MAX RESIDUAL MOMENT (MRFM)
- MAX ROTATION INCREMENT (MOI)
- MAX ROTATION CORRECTION (MOC)

Convergence Table

Subc	Time	Inc	Iter	MPE	MRF	MFO	MRF	MDI
1	0.1000E-01	1	0	--	--	--	--	--
1	0.1000E-01	1	1	--	--	-0.646571202E+05	0.193063631E+06	0.2705651209E+02
1	0.1000E-01	1	2	--	--	-0.205318290E+04	-0.8703312786E+02	0.2711865253E+02
1	0.1000E-01	1	3	--	--	-0.2505581504E+04	0.1283217338E+04	0.2694392770E+02
1	0.1000E-01	1	4	--	--	-0.1989174932E+04	0.4036289651E+01	0.2694123296E+02
1	0.2000E-01	2	0	--	--	--	--	--
1	0.2000E-01	2	1	--	--	-0.5286128390E+05	0.1556397453E+06	0.2694425348E+02
1	0.2000E-01	2	2	--	--	-0.4037610849E+04	-0.7576180670E+02	0.2699319912E+02
1	0.2000E-01	2	3	--	--	-0.4180881172E+04	0.3105480842E+03	0.2691228547E+02
1	0.2000E-01	2	4	--	--	-0.3973024212E+04	0.1978059781E+01	0.2691097544E+02
1	0.3500E-01	3	0	--	--	--	--	--
1	0.3500E-01	3	1	--	--	-0.1038432328E+06	0.3311632912E+06	0.4044944809E+02
1	0.3500E-01	3	2	--	--	-0.7103310067E+04	-0.205727543E+03	0.4055238619E+02
1	0.3500E-01	3	3	--	--	-0.7610288783E+04	0.1183404892E+04	0.4052912243E+02
1	0.3500E-01	3	4	--	--	-0.6948726786E+04	0.4253786366E+01	0.4053078450E+02
1	0.5750E-01	4	0	--	--	--	--	--
1	0.5750E-01	4	1	--	--	-0.265096330E+06	0.1026785268E+07	0.6167497324E+02
1	0.5750E-01	4	2	--	--	-0.1179682215E+05	0.1658493219E+04	0.6197163843E+02
1	0.5750E-01	4	3	--	--	-0.1541234481E+05	0.3152206773E+05	0.6203073206E+02
1	0.5750E-01	4	4	--	--	-0.1122887372E+05	0.7061380943E+02	0.6206657689E+02

Debugging the Results in HyperView (INT field is set to ITER)

- **Activate the checkbox of the result type whose peak value occurrence you wish to investigate and click on the corresponding Iteration in the Convergence Table. The corresponding grid point at which the result type attains its peak value is displayed in the Graphics browser of HyperView. Click Open and the monitored results are now loaded into the Window, as shown below:**

Debugging the Results in HyperView (INT field is set to ITER)

Max penetration error
No value

Max pressure error
No value

Max force
0.000000000E+00

Max residual force
-7.344750092E+01

Max displacement increment
0.2162769334E-01

Max displacement correction
0.9120669712E-02

Max moment
0.5209475970E+08

Max residual moment
-4.697679831E+05

Max rotation increment
-3.522780587E-02

Max rotation correction
-1.803510124E-02

Subcase 2 (Load) : Load Factor = 6.682460E-01 : Fram

1: M

Optistruct OUT File Parser
Select Out File

Out File: F:\work\ALGDISP\voids_rigidz_LD_05.out

Section Cuts

Show Section Cut for: mpe

Show highest occurrences

MAX PENETRATION ERROR (MPE) MAX DISPLACEMENT CORRECTION (MDC)

MAX PRESSURE ERROR (MPR) MAX MOMENT (MMT)

MAX FORCE (MFD) MAX RESIDUAL MOMENT (MRM)

MAX RESIDUAL FORCE (MRF) MAX ROTATION INCREMENT (MOI)

MAX DISPLACEMENT INCREMENT (MDI) MAX ROTATION CORRECTION (MOC)

Convergence Table

Subc.	Time	Inc.	Iter	MPE	MPR	MFD	MRF
2	0.8688E+00	1(1#2)	0	--	--	--	--
2	0.8688E+00	1(1#2)	1	--	--	0.000000000E+00	120927440E-
2	0.8688E+00	1(1#2)	2	--	--	0.000000000E+00	366634963E-
2	0.8688E+00	1(1#2)	3	--	--	0.000000000E+00	347934052E-
2	0.8688E+00	1(1#2)	4	--	--	0.000000000E+00	425445080E-
2	0.8684E+00	1(1#3)	0	--	--	--	--
2	0.8684E+00	1(1#3)	1	--	--	0.000000000E+00	308292137E-
2	0.8684E+00	1(1#3)	2	--	--	0.000000000E+00	354831773E-
2	0.8684E+00	1(1#3)	3	--	--	0.000000000E+00	349731923E-
2	0.8684E+00	1(1#3)	4	--	--	0.000000000E+00	409789432E-
2	0.8683E+00	1(1#4)	0	--	--	--	--

Node ID Node Coordinates
564 4.81006 100.032 3.60519

Nodes | le ID | le Pool | reference System

Feature Presentations & Demo Models

- For more v2017 feature presentations and demo models, follow the link [here](#).
- The major items for the 2017 release are:
 - Brake Squeal Analysis
 - Restart of Nonlinear Analysis
 - Neuber Stress and Strain output and optimization
 - Nonlinear Structural Transient Analysis
 - Subcase Dependent Model change (Contact and Elements)
 - Bore Deformation Calculation and Optimization
 - User-defined Material (Beta)
 - Friction table support for Nonlinear Analysis