

#1333: OptiStruct – On the fly output of Displacement Results for Nonlinear Analysis

Product: OptiStruct

Product Version: OptiStruct 2017.0 or above

Topic Objective

On the fly output of displacement results for nonlinear analysis with OptiStruct.

Topic Detail

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
- 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
- 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.

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:

The screenshot displays the HyperView interface with a 3D model of a curved structure. On the left, several monitoring data callouts are visible:

- Max penetration error: No value
- Max pressure error: No value
- Max force: 0.000000000E+00
- Max residual force: -7344750092E+01
- Max displacement increment: 0.2162769334E-01
- Max displacement correction: 0.9120669712E-02
- Max moment: 0.5209475970E+08
- Max residual moment: -4697679831E+05
- Max rotation increment: -3522780587E-02
- Max rotation correction: -1803510124E-02

The Optistruct OUT File Parser window is open, showing the following data:

Out File: F:\work\LGDISP\voids_igids_LD_OS.out

Section Cuts: mpe

Show highest occurrences:

- MAX PENETRATION ERROR (MPE)
- MAX DISPLACEMENT CORRECTION (MDC)
- MAX PRESSURE ERROR (MPR)
- MAX MOMENT (MM)
- MAX FORCE (MFO)
- MAX RESIDUAL MOMENT (MRM)
- MAX RESIDUAL FORCE (MRF)
- MAX ROTATION INCREMENT (MDI)
- MAX DISPLACEMENT INCREMENT (MDI)
- MAX ROTATION CORRECTION (MOC)

Convergence Table:

Subc.	Time	Inc.	Iter	MPE	MPR	MFO	MRF
2	0.8688E+00	12(H2)	0	--	--	--	--
2	0.8688E+00	12(H2)	1	--	--	0.000000000E+00	120927440E.
2	0.8688E+00	12(H2)	2	--	--	0.000000000E+00	386634963E.
2	0.8688E+00	12(H2)	3	--	--	0.000000000E+00	347934052E.
2	0.8688E+00	12(H2)	4	--	--	0.000000000E+00	425445088E.
2	0.8684E+00	12(H3)	0	--	--	--	--
2	0.8684E+00	12(H3)	1	--	--	0.000000000E+00	308292137E.
2	0.8684E+00	12(H3)	2	--	--	0.000000000E+00	354831773E.
2	0.8684E+00	12(H3)	3	--	--	0.000000000E+00	349731923E.
2	0.8684E+00	12(H3)	4	--	--	0.000000000E+00	409788432E.
2	0.8683E+00	12(H4)	0	--	--	--	--