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Subject ANSYS Tips & Tricks: Formatting Output Text
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1. Introduction:

In ANSYS, it is often useful to generate tabular output for postprocessing purposes. These text listings can be used to summarize data or to export into spreadsheets, such as Microsoft Excel, for data manipulation. This memo outlines some of the options available in ANSYS to produce and to format output listings: (1) the use of the /FORMAT statement with the PRxxxx series of commands and (2) the application of *VWRITE to create custom output.

2. Formatting PRxxxx commands:

In /POST1, the PRxxxx series of commands (e.g., PRNSOL, PRESOL, PRETAB, PRRSOL, PRPATH) provide the text equivalent of the plotting commands¹. The output can be controlled with the /FORMAT, /HEADER, and /PAGE commands.

An example of the default listing for these commands is shown below (PRNSOL,S,COMP):

```
***** ANSYS - ENGINEERING ANALYSIS SYSTEM  RELEASE 5.6      *****
ANSYS/Multiphysics/LS-DYNA
00999999          VERSION=INTEL NT          23:06:35  JAN 22, 2000 CP=      0.671

This is a title for the analysis
```

Page Header

```
This is subtitle 1 for the analysis
This is subtitle 2 for the analysis
This is subtitle 3 for the analysis
This is subtitle 4 for the analysis
```

Subtitle Section

```
***** POST1 NODAL STRESS LISTING *****
```

```
LOAD STEP=      1  SUBSTEP=      1
TIME=      1.0000      LOAD CASE=      0
```

Load Step Section

```
THE FOLLOWING X,Y,Z VALUES ARE IN GLOBAL COORDINATES
```

Notes Section

NODE	SX	SY	SZ	SXY	SYZ	SXZ
1	-0.25639E-01	-100.29	-0.25639E-01	-0.10843E-01	-0.10843E-01	-0.10944E-01
2	-58.504	-167.44	-58.504	-39.515	-39.515	0.99734
4	-0.19406	-98.655	-0.19406	0.11618	0.11618	0.29260E-01
6	0.64766	-94.108	0.64766	0.37543	0.37543	-0.12682E-01
8	-1.1411	-87.497	-1.1411	0.70785	0.70785	0.48771E-01
10	13.557	-84.224	13.557	6.2526	6.2526	-0.48336

Column Header

```
MINIMUM VALUES
NODE      2      2      2      2      2      696
VALUE -58.504 -167.44 -58.504 -39.515 -39.515 -1.1553

MAXIMUM VALUES
NODE     10     222     10     22     97     480
VALUE  13.557 -77.367  13.557  39.515  39.515  1.1553
```

Summary Section

As noted in red above, the output listings from the PRxxxx family of commands can be separated into seven general sections. The “Page Header” appears in batch listing printout and provides the ANSYS

¹ e.g., PLNSOL, PLESOL, PLETAB



version, license, platform time & date, and title of the analysis (/TITLE). The “Subtitle Section” lists the four subtitles, if created with the /STITLE command. The “Load Step Section” lists what type of printout is being generated along with load step/time information. The “Notes Section” specifies the results coordinate system (RSYS) in which the results are tabulated. The “Column Header” supplies the header for each column in the “Body” of the listing. The “Summary Section” provides either max/min values or totals from the PRXXXX command.

The /HEADER command controls the output of the six sections (excluding the “Body” listing). This can be most helpful when exporting the output for use in a spreadsheet program since extraneous information can be omitted. The default behavior is to show all sections.

The /FORMAT command specifies how the numbers are listed. The second argument of the /FORMAT command controls whether the numbers are shown in scientific notation (“E”), decimal format (“F”), or general format (“G”). General format switches between scientific or decimal format, depending on which is most appropriate – this is the default behavior. A sample listing from above is shown below:

General/mixed notation (/FORMAT,G):

NODE	SX	SY	SZ	SXY	SYZ	SXZ
1	-0.25639E-01	-100.29	-0.25639E-01	-0.10843E-01	-0.10843E-01	-0.10944E-01

Decimal notation (/FORMAT,E):

NODE	SX	SY	SZ	SXY	SYZ	SXZ
1	-0.02564	-100.28778	-0.02564	-0.01084	-0.01084	-0.01094

Scientific notation (/FORMAT,F):

NODE	SX	SY	SZ	SXY	SYZ	SXZ
1	-0.25639E-01	-0.10029E+03	-0.25639E-01	-0.10843E-01	-0.10843E-01	-0.10944E-01

This allows the user to change the way the listing is shown in the event that a secondary post-processing program (such as a spreadsheet program or custom Fortran/C code) only accepts values in a certain format.

Note that in the above text, there are five significant digits and twelve “place holders” total. This results in some values being placed together such as the “SYZ” scientific notation values shown above. One can change this behavior with the *NWIDTH* and *DSIGNF* arguments of the /FORMAT command:

Default listing (/FORMAT,,,12,5):

NODE	UX	UY	UZ	USUM
1	-0.15433E-04	-0.97685E-04	-0.15433E-04	0.10009E-03

Expanded listing, including space between values (/FORMAT,,,17,9):

NODE	UX	UY	UZ	USUM
1	-0.154331417E-04	-0.976845662E-04	-0.154331417E-04	0.100093148E-03

The second listing shows values with 9 significant digits as well as a space between the numbers. This was accomplished by setting the *DSIGNF* argument to “9” and the *NWIDTH* value to “*DSIGNF*+8”. The reason why 8 digits are added to the *NWIDTH* argument is because of the additional characters needed, including a space delimiter (-0.154331417E-04). Adding the space delimiter makes importing the text to a spreadsheet program easier (Excel allows importing using space-delimited text).

Another feature that can be controlled is when the header sections are repeated. The default behavior is to repeat the header sections per page, where a “page” consists of approximately 56 lines. To suppress the repeated header sections, the use of the /PAGE command becomes helpful. This command controls when lines are “wrapped around” as well as the how long each “page” is. This helps importing large amounts of data to other programs without needing to “clean up” the imported text.

For some nodal printout, midside nodes may be suppressed for higher-order elements. Midside node values can be listed for the PRNSOL command with PowerGraphics on (/GRAPH,POWER) and element faces set to “2” (/EFACET,2).



2.1 Example of Default Listing:

The following is an example of the default listing of PRNSOL,S,COMP with /HEADER,OFF,OFF,OFF,OFF:

NODE	SX	SY	SZ	SXY	SYZ	SXZ
1	-0.25639E-01	-100.29	-0.25639E-01	0.10843E-01	-0.10843E-01	0.10944E-01
2	-58.504	-167.44	-58.504	-39.515	-39.515	0.99734
4	-0.19406	-98.655	-0.19406	0.11618	0.11618	0.29260E-01
6	0.64766	-94.108	0.64766	0.37543	0.37543	-0.12682E-01
8	-1.1411	-87.497	-1.1411	0.70785	0.70785	0.48771E-01
10	13.557	-84.224	13.557	6.2526	6.2526	-0.48336
12	-0.25639E-01	-100.29	-0.25639E-01	0.10843E-01	-0.10843E-01	0.10944E-01
14	0.46461	-100.14	-0.69141E-01	0.11112	-0.15088E-01	0.62131E-01
16	1.5428	-100.11	-0.82764E-01	0.83176E-01	0.16169E-01	0.34014E-01
18	1.5428	-100.11	-0.82764E-01	0.83176E-01	0.16169E-01	0.34014E-01
20	0.46461	-100.14	-0.69141E-01	0.11112	-0.15088E-01	0.62131E-01
22	-58.504	-167.44	-58.504	39.515	-39.515	-0.99734
24	13.557	-84.224	13.557	-6.2526	6.2526	0.48336
26	-1.1411	-87.497	-1.1411	-0.70785	0.70785	-0.48771E-01
28	0.64766	-94.108	0.64766	-0.37543	0.37543	0.12682E-01
30	-0.19406	-98.655	-0.19406	0.11618	0.11618	-0.29260E-01
33	-45.732	-123.97	-43.071	-10.326	-37.762	0.13678
35	-52.709	-129.25	-46.442	-3.9746	-39.056	-0.42972E-01
37	-52.709	-129.25	-46.442	3.9746	-39.056	0.42972E-01
39	-45.732	-123.97	-43.071	10.326	-37.762	-0.13678
46	-2.0768	-94.700	9.6446	-7.0215	5.6448	-0.40336
48	-5.6337	-89.719	10.495	-3.0462	5.6970	-0.14708E-01
50	-5.6337	-89.719	10.495	3.0462	5.6970	0.14708E-01
52	-2.0768	-94.700	9.6446	7.0215	5.6448	0.40336
59	1.0369	-94.227	-0.78659	0.33059	0.52175	-0.24389
61	-0.35615E-01	-94.496	-0.71393	0.17978	0.67942	-0.84596E-01
63	-0.35615E-01	-94.496	-0.71393	-0.17978	0.67942	0.84596E-01
65	1.0369	-94.227	-0.78659	-0.33059	0.52175	0.24389
72	0.67670	-96.815	0.47826	1.5306	0.37042	-0.82004E-01
74	1.3599	-98.438	0.50211	0.71652	0.44605	-0.32519E-01
76	1.3599	-98.438	0.50211	-0.71652	0.44605	0.32519E-01
78	0.67670	-96.815	0.47826	-1.5306	0.37042	0.82004E-01
85	0.40508	-99.202	-0.14501	1.0554	0.88262E-01	-0.85699E-02
87	0.89158	-99.816	-0.15899	0.59686	0.12410	-0.65925E-02
89	0.89158	-99.816	-0.15899	-0.59686	0.12410	0.65925E-02
91	0.40508	-99.202	-0.14501	-1.0554	0.88262E-01	0.85699E-02
97	-58.504	-167.44	-58.504	-39.515	39.515	-0.99734
98	-58.504	-167.44	-58.504	39.515	39.515	0.99734
100	-45.732	-123.97	-43.071	-10.326	37.762	-0.13678
102	-52.709	-129.25	-46.442	-3.9746	39.056	0.42972E-01
104	-52.709	-129.25	-46.442	3.9746	39.056	-0.42972E-01
106	-45.732	-123.97	-43.071	10.326	37.762	0.13678
108	-0.25639E-01	-100.29	-0.25639E-01	0.10843E-01	0.10843E-01	-0.10944E-01
110	13.557	-84.224	13.557	-6.2526	-6.2526	-0.48336
112	-1.1411	-87.497	-1.1411	-0.70785	-0.70785	0.48771E-01
114	0.64766	-94.108	0.64766	-0.37543	-0.37543	-0.12682E-01
116	-0.19406	-98.655	-0.19406	-0.11618	-0.11618	0.29260E-01
118	-0.25639E-01	-100.29	-0.25639E-01	0.10843E-01	0.10843E-01	0.10944E-01
120	0.46461	-100.14	-0.69141E-01	0.11112	0.15088E-01	0.62131E-01
122	1.5428	-100.11	-0.82764E-01	0.83176E-01	0.16169E-01	0.34014E-01
124	1.5428	-100.11	-0.82764E-01	0.83176E-01	0.16169E-01	0.34014E-01
126	0.46461	-100.14	-0.69141E-01	0.11112	0.15088E-01	0.62131E-01
129	-0.19406	-98.655	-0.19406	0.11618	-0.11618	-0.29260E-01
131	0.64766	-94.108	0.64766	0.37543	-0.37543	0.12682E-01
133	-1.1411	-87.497	-1.1411	0.70785	-0.70785	-0.48771E-01
NODE	SX	SY	SZ	SXY	SYZ	SXZ
135	13.557	-84.224	13.557	6.2526	-6.2526	0.48336
142	-2.0768	-94.700	9.6446	-7.0215	-5.6448	0.40336
144	1.0369	-94.227	-0.78659	0.33059	-0.52175	0.24389
146	0.67670	-96.815	0.47826	1.5306	-0.37042	0.82004E-01
148	0.40508	-99.202	-0.14501	1.0554	-0.88262E-01	-0.85699E-02
155	-5.6337	-89.719	10.495	-3.0462	-5.6970	0.14708E-01

2.2 Example of Custom Listing:

The following is an example of a custom listing of PRNSOL,S,COMP with “/HEADER,OFF,OFF,OFF,OFF”, “/FORMAT,3,,15,7”, “/PAGE,200,,200”, and “/EFACET,2” with “/GRAPH,POWER”:

NODE	SX	SY	SZ	SXY	SYZ	SXZ
1	-0.256391E-01	-100.288	-0.256391E-01	-0.108430E-01	-0.108430E-01	-0.109442E-01
2	-58.5039	-167.442	-58.5039	-39.5151	-39.5151	0.997338
3	-0.933383E-01	-99.4959	-0.933383E-01	0.356408E-01	0.356408E-01	0.731394E-02
4	-0.194059	-98.6554	-0.194059	0.116177	0.116177	0.292599E-01
5	0.126160	-96.4512	0.126160	0.187337	0.187337	-0.225712E-01
6	0.647659	-94.1080	0.647659	0.375429	0.375429	-0.126815E-01
7	-1.06547	-91.5614	-1.06547	0.905706E-01	0.905706E-01	0.721746E-01
8	-1.14106	-87.4973	-1.14106	0.707854	0.707854	0.487711E-01
9	3.23803	-87.7048	3.23803	0.470672	0.470672	-0.471515
10	13.5566	-84.2242	13.5566	6.25256	6.25256	-0.483358
11	-18.6010	-123.137	-18.6010	-13.0952	-13.0952	0.489786
12	-0.256391E-01	-100.288	-0.256391E-01	0.108430E-01	-0.108430E-01	-0.109442E-01
13	0.160809	-100.218	-0.667340E-01	-0.247454E-01	-0.174144E-01	-0.217284E-01
14	0.464612	-100.142	-0.691407E-01	-0.111120	-0.150881E-01	-0.621315E-01
15	1.02387	-100.136	-0.669781E-01	-0.114724	-0.132993E-01	-0.544057E-01
16	1.54278	-100.108	-0.827644E-01	-0.831758E-01	-0.161695E-01	-0.340145E-01
17	1.61979	-100.079	-0.620252E-01	-0.928195E-12	-0.119309E-01	-0.306734E-12
18	1.54278	-100.108	-0.827644E-01	0.831758E-01	-0.161695E-01	0.340145E-01
19	1.02387	-100.136	-0.669781E-01	0.114724	-0.132993E-01	0.544057E-01
20	0.464612	-100.142	-0.691407E-01	0.111120	-0.150881E-01	0.621315E-01
21	0.160809	-100.218	-0.667340E-01	0.247454E-01	-0.174144E-01	0.217284E-01
22	-58.5039	-167.442	-58.5039	39.5151	-39.5151	-0.997338
23	-18.6010	-123.137	-18.6010	13.0952	-13.0952	-0.489786
24	13.5566	-84.2242	13.5566	-6.25256	6.25256	0.483358
25	3.23803	-87.7048	3.23803	-0.470672	0.470672	0.471515
26	-1.14106	-87.4973	-1.14106	-0.707854	0.707854	-0.487711E-01
27	-1.06547	-91.5614	-1.06547	-0.905706E-01	0.905706E-01	-0.721746E-01
28	0.647659	-94.1080	0.647659	-0.375429	0.375429	0.126815E-01
29	0.126160	-96.4512	0.126160	-0.187337	0.187337	0.225712E-01
30	-0.194059	-98.6554	-0.194059	-0.116177	0.116177	-0.292599E-01
31	-0.933383E-01	-99.4959	-0.933383E-01	-0.356408E-01	0.356408E-01	-0.731394E-02
32	-48.5972	-143.773	-49.1509	-24.4385	-38.5924	0.720488
33	-45.7323	-123.973	-43.0713	-10.3263	-37.7622	0.136782
34	-52.9935	-128.473	-46.4461	-7.66786	-38.4615	-0.135283
35	-52.7086	-129.255	-46.4417	-3.97463	-39.0559	-0.429722E-01
36	-52.2043	-129.407	-46.3361	0.162315E-11	-39.0435	0.119777E-12
37	-52.7086	-129.255	-46.4417	3.97463	-39.0559	0.429722E-01
38	-52.9935	-128.473	-46.4461	7.66786	-38.4615	0.135283
39	-45.7323	-123.973	-43.0713	10.3263	-37.7622	-0.136782
40	-48.5972	-143.773	-49.1509	24.4385	-38.5924	-0.720488
41	-22.4566	-109.451	-14.7154	-9.97833	-13.7853	-0.775453E-01
42	-28.1089	-107.827	-15.5293	-3.31334	-14.2130	-0.313618E-01
43	-28.1089	-107.827	-15.5293	3.31334	-14.2130	0.313618E-01
44	-22.4566	-109.451	-14.7154	9.97833	-13.7853	0.775453E-01
45	4.48278	-90.0626	11.0220	-1.15721	5.99726	-0.582374
46	-2.07679	-94.7004	9.64464	-7.02152	5.64477	-0.403358
47	-2.57803	-91.6106	10.6835	-4.49880	5.62181	-0.486293E-01
48	-5.63371	-89.7189	10.4947	-3.04622	5.69704	-0.147078E-01
49	-5.67390	-89.7166	10.4243	0.346168E-12	5.69805	-0.581167E-13
50	-5.63371	-89.7189	10.4947	3.04623	5.69704	0.147078E-01
51	-2.57803	-91.6106	10.6835	4.49880	5.62181	0.486293E-01
52	-2.07679	-94.7004	9.64464	7.02152	5.64477	0.403358
53	4.48278	-90.0626	11.0220	1.15721	5.99726	0.582374
54	-1.48269	-93.9535	3.07446	-2.26523	1.23000	-0.405325
55	-3.46642	-93.3050	3.13325	-1.45442	1.19388	-0.566876E-01
56	-3.46642	-93.3050	3.13325	1.45442	1.19388	0.566876E-01
57	-1.48269	-93.9535	3.07446	2.26523	1.23000	0.405325
58	0.759306	-90.7876	-0.700557	0.893444	0.573660	-0.120662
59	1.03692	-94.2273	-0.786592	0.330589	0.521746	-0.243891
60	-0.157240	-94.4766	-0.974832	-0.620564E-02	0.646471	-0.143105
61	-0.356153E-01	-94.4957	-0.713933	0.179776	0.679417	-0.845962E-01



Note that in the previous example, the number of digits was increased, the “header sections” were not repeated, spaces were included between all the values, and midside node stresses were reported.

3. Creating custom output:

While changing the format of the listings from the PRxxxx commands is useful, generating customized text output may be necessary. This can be accomplished by creating arrays (*DIM), getting postprocessing data (*VGET), and writing the results to file (*VWRITE).

An example of the use of *VWRITE is listed below:

```
*get,NCOUNT,node,,count          ! Get total number of selected nodes
*dim,NARRAY,array,NCOUNT,3       ! Create NCOUNT x 3 array

/post1
set,last
*cfdopen,temp,txt                ! Create file called "temp.txt"
*vwrite                          ! Writes a column header
('x-dist',8x,'y-disp',10x,'z-disp')
*vget,NARRAY(1,1),node,1,loc,x   ! Fill first column with x-location
*vget,NARRAY(1,2),node,1,u,y     ! Fill second column with y-displ.
*vget,NARRAY(1,3),node,1,u,z     ! Fill third column with z-displ.
*vwrite,NARRAY(1,1),NARRAY(1,2),NARRAY(1,3) ! Write three columns to file
(F6.2,2X,E13.5,2X,E13.5)        ! Format with decimal and scientific
finish
```

The above macro creates the following output:

x-dist	y-disp	z-disp
0.00	-0.97685E-04	-0.15433E-04
0.00	-0.87680E-04	-0.15285E-04
0.00	-0.77759E-04	-0.15161E-04
0.00	-0.68004E-04	-0.15051E-04
0.00	-0.58444E-04	-0.14879E-04
0.00	-0.49170E-04	-0.14568E-04
0.00	-0.40244E-04	-0.13912E-04
0.00	-0.31982E-04	-0.13021E-04
0.00	-0.23374E-04	-0.10712E-04
0.00	-0.12705E-04	-0.80626E-05
10.00	-0.97685E-04	-0.15433E-04
9.00	-0.97507E-04	-0.15424E-04
8.00	-0.97302E-04	-0.15393E-04
7.00	-0.97080E-04	-0.15349E-04
6.00	-0.96919E-04	-0.15313E-04
5.00	-0.96855E-04	-0.15300E-04
4.00	-0.96919E-04	-0.15313E-04

As mentioned above, this output can be customized in any manner, including the numerical format and content. ANSYS does not store midside node information for derived data (e.g., stresses), so please keep this in mind when using the *VGET command. Derived midside nodal data is always interpolated from corner node data, which is stored. The reader is referred to the online help for *VGET and *VWRITE as well as Ch. 3.11 “Array Parameters” in the *ANSYS APDL Programmer’s Guide* for more information.

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Engineering Consultant



ANSYS Tips and Tricks

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Corrections, comments, and suggestions are welcome and can be sent to operator@csi-ansys.com [they will be distributed to the appropriate person(s)]. While CSI engineers base their “Tips & Tricks” on technical support calls and user questions, ideas on future topics are appreciated. Users who wish to submit their own “ANSYS Tips and Tricks” are encouraged to do so by emailing the above address for more information.

XANSYS Mailing List

The xansys mailing list is a forum for questions and discussions of the use of ANSYS. As of 12/99, there are more than 900 subscribers with topics ranging from Structural, Thermal, Flotran, to Emag analyses, to name a few. Users are encouraged to subscribe to evaluate the usefulness of the mailing list for themselves. Also, either (a) using the mail program to filter [xansys] messages or (b) using the “digest” option to receive one combined email a day is strongly recommended to minimize sorting through the volume of postings.

This list is for *ALL* users of the ANSYS finite element analysis program from around the world. The list allows rapid communication among users concerning program bugs/ideas/modeling techniques. This list is NOT affiliated with ANSYS, Inc. even though several members of the ANSYS, Inc. staff are subscribers and regular contributors.

To SUBSCRIBE: send blank email to xansys-subscribe@onelist.com
To unsubscribe send blank email to xansys-unsubscribe@onelist.com
Archived on <http://www.infotech.tu-chemnitz.de/~messtech/ansys/ansys.html>
ANOTHER archive on <http://www.eScribe.com/software/xansys/>
(A poor archive is also at <http://www.onelist.com/archives.cgi/xansys>)

CSI ANSYS Technical Support

Collaborative Solutions, Inc. is committed to providing the best customer support in our industry. Three people will be devoted to technical support from 8:00am to 5:00pm PST every working day. CSI customers with active TECS (maintenance) agreements may contact CSI by any of the following ways:

Phone: 760-431-4815 (ask for ANSYS technical support)
Fax: 760-431-4824
Web: <http://www.csi-ansys.com>
E-mail: firstname.lastname@csi-ansys.com
Anonymous ftp site: <ftp://ftp.csi-ansys.com>

CSI Engineers:
Karen Dhuyvetter
Greg Miller
Sean Harvey
Alfred Saad
Bill Bulat
Sheldon Imaoka
David Haberman

All comments and suggestions are welcome.