

SOL 700,ID

Executes MSC Nastran Explicit Nonlinear (SOL 700)

Format:

SOL 700,ID PATH= STOP= NP(or DMP700)= MEM(or MEM700)= DBL(or DBL700)= FSIDMP=
HPMPI= INTELMPPI= EID= YES BLADEOUT

Examples:

SOL 700,129 PATH=3 NP=4
SOL 700,129 NP=2 MEM=500 DBL=YES
SOL 700,129 MEM=250

(700,129 request nonlinear transient dynamics, path=3 requests use of the SOL 700 script called out in file sol700.pth, np=4 requests that 4 processors be used)

Summary:

SOL 700 is an Executive Control statement like SOL that activates an explicit nonlinear transient analysis integration scheme. The calculations will not be performed directly within MSC Nastran. Instead, SOL 700 will use a separate solver spawned from MSC Nastran. This client-server approach is similar to SOL 600, using Marc.

The SOL 700 statement will spawn an executable which is a 3D, explicit nonlinear analyses code DMP (distributed memory parallel processing domain decomposition) capabilities.

For ID=129 or NLTRAN, SOL 700 will generate an intermediate input data file, jid.dytr.dat, where “jid” is the name of the MSC Nastran input file without the extension). For example, if the MSC Nastran input file is named abcd.dat, (or abcd.bdf) then “jid”=abcd).

Unless specified differently using the **STOP=3** option, the executable will be executed from MSC Nastran on any computer system capable of doing so (which includes most LINUX systems and Windows systems). For it to run, it must be installed, properly licensed, and accessible from the directory where the MSC Nastran input data resides, MSC_BASE must be provided in the environment.

Nastran SOL 700 Update:

Starting in Version 2017.1 there is a change in the execution of MSC Nastran SOL 700. Customers that have a lease agreement will no longer be able to run MSC Nastran SOL 700 jobs. The binaries needed are usually located in the msc20171/dyna directory of the Nastran installation. However this directory will be missing after the installation of MSC Nastran 2017.1. When a user tries to execute a job for SOL 700, the following message will be issued by Nastran in the f06 file:

SOL 700 with LS-Dyna is requested, but the installation of LS-Dyna seems to be missing. Please, download the additional installer for LS-Dyna from the MSC Download Center and install it if you have a valid license under maintenance.



Paid-up customers will have an option to download an addition installer from the SDC site. This installer only contains the binaries needed for SOL 700 and it should be installed after the installation of the regular Nastran application. For those customers, there will be no change in the FlexLM License features and the features can be used of MSC Nastran version 2017.0.

Executive Control Parameters:

The required ID may be one of several valid solution sequence integers or names shown in [Table 3-4](#) for the SOL statement. Examples are 129 and NLTRAN.

The following solutions are available: 101, 106, 109, 129 (and their equivalent names).

All items on the SOL 700,ID after ID itself may be specified by environmental variables. This may be done any way environmental variables can be set. They may be set by the MSC Nastran user at run time or by the system administrator when MSC Nastran is installed. Any values specified on the SOL statement override those in the environment. Environmental variables are fully described in the [MSC Nastran 2017.1 Installation and Operations Guide](#). A keywords file is available to describe the format of each variable. The variable is normally set in the system-wide rc file, a user's rc file, a local rc file or in a script used to submit MSC Nastran.

The following describes the various options for PATH. We suggest that PATH=3 for all computer systems.

PATH=1 (Windows Only)

If **PATH=1** is specified, MSC Nastran will determine the proper command to execute a **serial run**. To aid MSC Nastran in determining where dytran-lsdyna is located, the **dynrun.pth** file must be located in the same directory where the MSC Nastran input file resides. The dynrun.pth file must contain one line providing the location (complete path) of the SOL 700 run script. A typical example of the line in the file dynrun.pth follows.

Windows c:\sol700\

A string is appended to this path to form the complete command used to execute the SOL 700 executable. "dytran-lsdyna jid=name.dytr.dat O=name.dytr.d3hsp G=name.dytr.d3plot D=name.dytr.d3dump F=name.dytr.d3thdt A=name.dytr.runrsf B=name.dytr.d3drfl

For Windows, MSC Nastran will spawn the external executable using the following command assuming the MSC Nastran input data is named enf2e.dat. (Although the example appears like it is on multiple lines, it is actually on a single line.)

c:\sol700\dytran-lsdyna i=enf2e.dytr.dat O=enf2e.dytr.d3hsp G=enf2e.dytr.d3plot D=enf2e.dytr.d3dump F=enf2e.dytr.d3thdt A=enf2e.dytr.runrsf B=enf2e.dytr.d3drfl



PATH=3 (All Systems)

If **PATH=3** is specified, a script or batch file located in the same directory as the SOL 700 executable will be executed. The name of the script or batch files is `dytrandmp.py`. This directory and name of the script is determined by the first line in a file named `sol700.pth` which must be in the same directory as the Nastran input file. Options are specified on subsequent lines of the `sol700.pth` file.

Available PATH=3 options for Windows PC systems are as follows:

<code>exe=</code>	The full path to the executable that is to be used. Optional -- If <code>exe=</code> is omitted, the directory where the script or batch file resides (first line of <code>sol700.pth</code>) will be used and <code>dytran-lsdyna</code> for Linux and <code>dytran-lsdyna.exe</code> for windows will be appended. If <code>exe=</code> is used, it must be the second line in the <code>sol700.pth</code> file.
<code>nproc</code>	Number of processors. (Default is to use NP on the SOL 700 line. If NP and <code>nproc</code> are omitted, the default is 1). For parallel execution, the directory where the MSC Nastran input file exists must be shared with read/write privileges. If <code>wdir</code> is used, it must also be shared (see below). The directory where the <code>dytran-lsdyna</code> executable resides must also be shared for parallel execution.
<code>bat</code>	Run in background or foreground (Default).
<code>memory</code>	Amount of memory. Example: <code>memory=200m</code> (200 mega words/ 800 megabytes). If <code>mem(or MEM700)=</code> is placed directly on the command line (not in <code>sol700.pth</code>) the value entered may not have "m" or any other letter(s) at the end. "m" will automatically be appended.
<code>wdir</code>	Working directory. For parallel execution, this directory must be shared with read/write privileges. Default is directory where MSC Nastran input resides.
<code>copy</code>	Yes or no. Input and output files are copied from <code>wdir</code> to the input directory. Default is yes.
<code>machine</code>	Machines and number of processors to use in the form: <code>machine1#2+machin2#4</code> (use 2 processors on machine 1 and 4 processors on machine 2)
<code>host</code>	file name. Name of a hostfile containing the same information as "machine" The format of hostfile is as follows for the example for machine: <code>machine1 2</code> <code>machine1 4</code>
<code>hpmmpi</code>	To activate the HP MPI set <code>hpmmpi</code> equal to yes. Default is no. If <code>HPMPI=YES</code> is placed directly on the command line (not in <code>sol700.pth</code>) HP MPI will be activated too.
<code>intelmpi</code>	To activate the INTEL MPI set <code>intelmpi</code> equal to yes. Default is no. This option is only available on Windows 64. If <code>INTELMPI=YES</code> is placed directly on the command line (not in <code>sol700.pth</code>) INTEL MPI will be activated too.
<code>scale</code>	scale factor for binary file (<code>d3plot</code> , <code>binout</code> , etc) sizes. (default=70) The default size is around 1GB. Example: <code>scale=70</code>

A Windows example of the file `sol700.pth` for the **PATH=3** case follows.

```
/app/msc/msc20170/python/linux64_rhe71i8/bin/python3.5
/app/msc/msc20170/dyna/linux64/bin/dytrandmp.py nastran
nproc=4
memory=20m
wdir=f:\temp
machine=cp01#2+cp02#2
```

For the above example, MSC Nastran will create the following command to spawn the SOL 700 executable assuming your input file is named abcd.dat. (Although the example appears like it is on multiple lines, it is actually on a single line.)

```
C:\MSC.Software\MSC_Nastran\20170\msc20170\python\win64i8\python.exe
C:\MSC.Software\MSC_Nastran\20170\msc20170\dyna\win64\bin\dytrandmp.py nastran
nproc=6
memory=90m
machine=bari#2+pisa#4
```

Available PATH=3 options for Linux systems follows:

copy	Yes or no. Input and output files are copied from wdir to the input directory. Default is yes.
dbl	Specifying dbl=yes indicates to run the double precision version (R8I8). This is required for prestress and thermal calculations and is recommended for Time Domain NVH problems. Default is no.
debug	Specifying debug=yes indicates if you want to keep scratch files and other debug information to investigate when a job fails to run. Default is no.
eid	<p>ARCid,NCYCLE,MESHID: ARCid is the filename of archive result file of a previous Euler calculation. NCYCLE is the cycle number in the ARC file which will be used for the follow-up simulation. MESHID is the mesh ID of the Euler mesh that is initialized. If EID= is placed directly on the command line (not in sol700.pth) it will work as the same as eid in sol700.pth. If only one cycle is stored in the ARCid file, NCYCLE may remain blank. eid can be repeated up to 10 times on the command line. If more than one eid is used, MESHID is required to indicate which ARCid is initializing which Euler mesh. If only one eid is used, MESHID may remain blank.</p> <p>Examples:</p> <pre>eid=BLAST_EULER_539.ARC or eid=LEFT_EULER_80.ARC,,1 eid=RIGHT_EULER_80.ARC,,2</pre>
exe	The full path to the executable for dytran-lsdyna that is to be used. (Optional)
fsidmp	Specifying fsidmp=yes indicates to run the FSI Distributed Memory Parallel version. Default is no. If FSIDMP=YES is placed directly on the command line (not in sol700.pth) FSI Distributed Memory Parallel will be activated too.



hlist	The (local) filename containing the hosts list. If this file is not given or not found, a default local hosts list is used. Note that the MPI universe in which the selected nodes and CPUs reside is expected to exist and be accessible (i.e., be booted).
hpmmpi	To activate the HP MPI set hpmmpi equal to yes. Default is no. If HPMPI=YES is placed directly on the command line (not in sol700.pth) HP MPI will be activated too.
memory	Amount of memory; example: memory=200m (200 mega words/800 megabytes). If MEM(or MEM700)= is placed directly on the command line (not in sol700.pth) the value entered may not have "m" or any other letter(s) at the end. "m" will automatically be appended.
mpipath	The MPI install directory if you wish to used a non-default MPI directory.
mpirun	The MPI run command you want to use. If entered, it overrides the default MPI run command on your machine as well as the command in mpipath.
nproc	Number of processors. (Default is to use NP on the SOL 700 line. If NP and nproc are omitted, the default is 1.) NOTE: The number of requested processes must be a power of 2.
wdir	Working directory. Default is directory where MSC Nastran input resides.
intelpmi	To activate the INTEL MPI set intelpmi equal to yes. Default is no. If INTELMPI=YES is placed directly on the command line (not in sol700.pth) INTEL MPI will be activated too.
scale	scale factor for binary file (d3plot, binout, etc) sizes. (default=70) The default size is around 1GB. Example: scale=70

A Linux example of the file sol700.pth for the PATH=3 case is as follows:

```
/app/msc/msc20170/python/linux64_rhe71i8/bin/python3.5
/app/msc/msc20170/dyna/linux64/bin/dytrandmp.py nastran
nproc=4
memory=20m
```

For the above example, MSC Nastran will create the a command similar to the following to spawn dytranlsdyna assuming your input file is named abcd.dat

```
C:\MSC.Software\MSC_Nastran\20170\msc20170\python\win64i8\python.exe
C:\MSC.Software\MSC_Nastran\20170\msc20170\dyna\win64\bin\dytrandmp.py nastran
nproc=6
memory=90m
machine=bari#2+pisa#4
```

If PATH is not specified, the default search path will be used to locate the dytran-lsdyna executable. This version will be located in a subdirectory named dyna/machine below the MSC Nastran base directory (MSC_BASE). Not all PATH3 options are available using this default path option.

STOP

STOP is an optional item. STOP is used to prevent execution of dytran-lsdyna or prevent execution of MSC Nastran after IFP if so desired. The various options are as follows:

