MSC Nastran SOL 700 Update

Starting in MSC Nastran 2018.0 there is a change in the execution of MSC Nastran SOL 700. SOL 700 with LS-Dyna is no longer supported by MSC Nastran. Instead, a new explicit solver is introduced in MSC Nastran 2018.0. This version can be activated by adding VERSION = PRIMARY to SOL 700 in the input file or simply by leaving it blank as this will be the default. A new license feature will be needed to run this new version: NA_Explicit_Dytran.

The new SOL 700 will support both DMP and SMP parallelization. For this, the solver will pull licenses from the following license feature: NA_Parallel.

Customers that have a lease agreement will no longer be able to run MSC Nastran SOL 700 jobs from version of MSC Nastran before 2018.0. The binaries needed were in the prior version located in msc20171/dyna directory of the MSC Nastran installation. However, this directory will be missing after the installation of MSC Nastran 2018.0.

Paid-up customers of MSC Nastran before 2018.0 can continue to use MSC Nastran SOL 700 jobs from version of MSC Nastran before 2018.0. For those customers, there will be no change in the FlexLM License features.

While most of the fields in the input files are compatible, there will be some changes. For instance for the materials, the primary version of SOL 700 will no longer support the MATDxxx entries (with MATDEUL as the only exception). Instead, the following materials can be used:

Material Type	SOL 700 VERSION=PRIMARY	LS-Dyna Based Sol 700	Dytran
Elastic	MAT1	MATD001	MAT1/DMATEL
Elastic Plastic	MAT1+MATEP+MATF	MATD024/MATD098/...	DMATEP+YLDxx+FAILxx
Orthotropic	MAT1+MATORT+MATF	MATD040/MATD130/...	MATORT
CAP	MAT1+MATEP+MATF	MATD078	DYMAT25
Foam	MAT1+MATHE	MATD053/MATD063/...	FOAMx
Rubber	MAT1+MATHE	MATD77O	RUBBERx

The following entries will not be supported by SOL 700 VERSION=PRIMARY:

ACC	ACCMETR	AIRBAG	BCGM700
BCPROP1	BDFORC	BDYRELX	BLDOUT
CBELT	CBUTT	CCSRFIL	CENTRUDS
CFILLET	COMBWLD	CONSPOT	CONV3
CORDxRX	CROSSEC	CSPOT	CSPH
CTQUAD	CTTRIA	D2R0000	D2RAUTO
D2RINER	DAMPGBL	DAMPMAS	DAMPSTF
DBEXSSS	DBREG	DYCHANG	DYDELEM
DYPARAM,LSDYNA,xxx	DYRELAX	DYRIGSW	DYTERMT

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DYTIMHS	EOSMG2	EOSTABx	EXPLSV
GRIA	ISTRNx	ISTRSx	MATDxxx
PBDISCR	PBEAM71	PBELTD	PBSPOT
PLBLAST	PRESTRS	PSHELLD	PSOLIDD
PSPH	PSPRMAT	PTSHELL	QBDY4
RADBC2	RBE2A	RBE2D	RBE2F
RBE3D	RBJSTIF	RESTART	SBPRET
SBRETR	SBSENSR	SBSLPR	SEQROUT
SOL2SPH	SPCD2	SPCNR	SPHDEF
SPHSYM	SPRBCK	SPWRS	TABISTR
TABLEDR	TICD	TIMNAT	TIMNVH
TIMSML	TIRE1	WALGEO	

The focus of the first version will be heavily relying on fluid solver and FSI applications. Here is a small selection of application areas that SOL 700 `VERSION=PRIMARY` can be used for:

Shock wave	Blast wave	JWL explosions
Water waves	Sequential explosions	Blast containment
Birdstrike	Piston	Airbags
Mine blast	Shaped charge	Fuel tank filling
Fuel tank sloshing	UNDEX	Blade containment
Hydroplaning	Fluid filled containers	Landmine explosions

SOL 700 `VERSION=PRIMARY` will also support both DMP and SMP parallelization. For this, the solver will pull licenses from the following license feature: `NA_Parallel`.

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