GENESIS® QUICK REFERENCE

Version 11.0

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EXECUTIVE CONTROL

ID	**K2UU** / **M2UU** = *file name*
LENVEC = *n*	
THREADS = *n*	
IOBUFF = *n, m*K	**K2UU1** / **M2UU1** = *pid, file name*
DIAG = *m1,m2,...*	
ESLDISP = *m,shared_object_path* **ESLCONF** = *m,data*	**SOL** *n*
CHECK **ANALYSIS** **REDUCE** **SENSITIVITY**	**DLIB** = *shared_object_path* **DRESP3** = *shared_object_path* **GNMASS** = *shared_object_path* **GNUSER** = *executable_path* **UFDATA** = *file_path*
SSOLID = *n*	**RESTART** = *n,m*
TOPOLOGY	**CEND**
TSURFACE = *n*	**POST** = *BINARY, FORMAT, PLOT, OUTPUT2, PUNCH, PATRAN, IDEAS*
DIRDAF, **DIRSAF**, **DIRSMS**, **DIRALL** = *directory name*	

SOLUTION CONTROL

OUTPUT CONTROL

TITLE = *string*	**MPRINT** = ***ALL***, *FIRST, NONE*
SUBTITLE = *string*	
LINE = *n*, *m* Default: *n*=64, *m*=132	**DYNOUTPUT** = ***RECTANGULAR***, *POLAR*
SUMMARY = ***YES***, *NO*	**POSTOUTPUT** = ***BASIC***, *GENERAL*
ECHO = ***BOTH***, *SORT, UNSORT, NONE* **ECHOON** **ECHOOFF**	**AUTORIB** = *pset,ht,thk,e,nu,rho,nelht*
	DVBASIS = *dvid, lb, ub, n*
APRINT, **DPRINT**, **UPRINT** = ***ALL***, *FIRST, LAST, FLAST, n, NONE*	**TIMES** = *PRINT, SCREEN, BOTH,* ***NONE***

USER MATRIX SELECTION

B2GG = *matrix name*	**K2GG** = *matrix name*
K2PP = *matrix name*	**K42GG** = *matrix name*
M2GG = *matrix name*	**P2G** = *matrix name*

NONSTRUCTURAL MASS SELECTION

NSM = *m*	

BOLD = Input Command *ITALIC* = User Options
BOLD and ITALIC = Default Value

LOADCASE DEFINITION

LOADCASE = *m*	**MODTRK** = ***YES***, ***NO***, ***ALL***
LABEL = *string*	
LOADCOM = *m*	
LOADSEQ = *r1, [r2, . . rn]*	**ASET** = *m*
CENTRIFUGAL = *m*	**QSET** = *m*
LOAD = *m*	**CBMETHOD** = *m*
GRAVITY = *m*	**MAAUSER** = ***YES***, ***NO***
TEMPERATURE = *m*	
DEFORM = *m*	**BOUNDARY** = *m*
MPC = *m*	**HEAT** = *m*
SPC = *m*	**DLOAD** = *m*
SUPORT = *NONE, m, AUTO*	**FREQUENCY** = *m*
	SDAMPING = *m*
ESLOAD = *m,data*	**MODES** = *m*
STATSUB = *m*	**RANDOM** = *m*
METHOD = *m*	

ANALYSIS AND SENSITIVITY OUTPUT

SET n = n_1, [n_2,n_3...n_n]	**MASS**, **VOLUME** = ***YES***, ***NO***
DISP, VELO, ACCE, OLOAD, SPCFORCE, GSTRESS, FORCE, STRESS, STRAIN, SVECTOR, ESE, THERMAL, UFDISP, UFVELO, UFACCE = *ALL, n,* ***NONE***, *BOTH, BOTH, ALL, BOTH, n, POST, POST, ALL, POST, n*	**GRMASS** = *POST*, ***NONE***
	ALOAD, **K4AA** = *DMIG*, ***NONE***
	KAA, **MAA** = *DMIG, POST,* ***NONE***
	MCONTRIB = *ALL, n,* ***NONE***
for RANDOM ACCE, VELO, DISP, STRESS, STRAIN & FORCE, there are other options too: RPRINT,RPUNCH, PSDF, RMS, ATOC and RALL	**KAASENS**, **MAASENS** = *POST*, ***NONE***
	SENSITIVITY = *PRINT, POST, BOTH,* ***NONE***
DVSHAPE=*dvid, lb, ub, n, maxb*	**DRESP2** = ***YES***, *NO*

DESIGN OUTPUT

DESIGN = *PROP, GRID, MAT, ALL,* ***NONE***	**BASIS**, **PERTURBATION**, **SHAPE**, **SIZING**, **THICKNESS**, **DENSITY** = *POST*, ***NONE***
DVGRID = *PRINT*, ***NONE***	
SSOL = ***NO***, *YES, YES, FIXNORM*	**TVAR** = *ALL, USER,* ***NONE***
GRAPH = ***YES***, *NO*	**TSURF** = ***YES***, *NO*, *L1, L2, ..., L10*

ANALYSIS DATA

Analysis data must be provided to define the finite element model , the boundary condition and the applied loads.

PARAMETERS

PARAM	N	V1							
DISTOR	ETYPE	TYPE	ERR/WAR	OPTION	V1	V2			
SWLDPRM	PARAM1	VAL1	PARAM2	VAL2	PARAM3	VAL3	PARAM4	VAL4	
+	PARAM5	VAL5	-etc.-						

GENERAL

GRDSET	Blank	CP	Blank	Blank	Blank	CD	PS		
PROPSET	PSID	TYPE	PID1	PID2	PID3	PID4	PID5	PID6	
+	PID7	-etc.-							
BAROR		PID			X1/G0	X2	X3		
BEAMOR		PID			X1/G0	X2	X3		
TEMPD	SID	T	SID	T	SID	T	-etc.-		
INCLUDE	'file name'								
ECHOON									
ECHOOFF									

COORDINATE SYSTEMS

CORD1C	CID	G1	G2	G3	CID	G1	G2	G3	
CORD1R	CID	G1	G2	G3	CID	G1	G2	G3	
CORD1S	CID	G1	G2	G3	CID	G1	G2	G3	
CORD2C	CID	RID	A1	A2	A3	B1	B2	B3	
+	C1	C2	C3						
CORD2R	CID	RID	A1	A2	A3	B1	B2	B3	
+	C1	C2	C3						
CORD2S	CID	RID	A1	A2	A3	B1	B2	B3	
+	C1	C2	C3						

BOUNDARY CONDITION & CRAIG-BAMPTON DOF & RESIDUAL VECTORS DOF

MPC	SID	G1	C1	A1	G2	C2	A2		
+	Blank	G3	C3	A3	-etc.-				
MPCADD	SID	SID1	SID2	SID3	SID4	SID5	SID6	SID7	
+	SID8	SID9	-etc.-						
SPC	SID	G	C	D	G	C	D		
SPC1	SID	C	G1	G2	G3	G4	G5	G6	
+	G7	G8	G9	-etc.-					
SPCADD	SID	SID1	SID2	SID3	SID4	SID5	SID6	SID7	
+	SID8	SID9	-etc.-						
SPCD	SID	G1	C1	D1	G2	C2	D2		
+	Blank	G3	C3	D3	-etc.-				
SUPORT1	SID	G1	C1	G2	C2	G3	C3		
ASET2	SID	G1	C1	G2	C2	G3	C3		
+	G4	C4	G5	C5	G6	C6	G7	C7	
+	G8	C8	-etc.-						
ASET3	SID	C	G1	G2	G3	G4	G5	G6	
+	G7	G8	G9	G10	G11	G12	G13	G14	
+	G15	G16	-etc.-						
QSET2	SID	G1	C1	G2	C2	G3	C3		
+	G4	C4	G5	C5	G6	C6	G7	C7	
+	G8	C8	-etc.-						
QSET3	SID	C	G1	G2	G3	G4	G5	G6	
+	G7	G8	G9	G10	G11	G12	G13	G14	
+	G15	G16	-etc.-						
USET	NAME	G1	C	G2	C	G3	C		
USET1	NAME	C	G1	G2	G3	G4	G5	G6	
+	G7	G8	-etc.-						

GRID INFORMATION

GRID	ID	CP	X1	X2	X3	CD	PS		
+	MV	X1L	X1U	X2L	X2U	X3L	X3U	XR	
SPOINT	ID	ID	ID	-etc.-					

ELEMENTS

CBAR	EID	PID	GA	GB	GO/X1	X2	X3		
+	PA	PB	W1A	W2A	W3A	W1B	W2B	W3B	
CBEAM	EID	PID	GA	GB	GO/X1	X2	X3		
+	PA	PB	W1A	W2A	W3A	W1B	W2B	W3B	
+	SA	SB							
CBUSH	EID	PID	GA	GB	GO/X1	X2	X3	CID	
+	S	OCID	S1	S2	S3				
CDAMP1	EID	PID	G1	C1	G2	C2			
CDAMP2	EID	B	G1	C1	G2	C2	PID		
CELAS1	EID	PID	G1	C1	G2	C2			
CELAS2	EID	K	G1	C1	G2	C2	GE	SRC	
CGAP	EID	PID	GA	GB	GO/X1	X2	X3	CID	
CHBDY	EID	PID	TYPE	G1	G2	G3	G4		
+	GA1	GA2	GA3	GA4	V1	V2	V3		
CHEXA	EID	PID	G1	G2	G3	G4	G5	G6	
+	G7	G8	G9	G10	G11	G12	G13	G14	
+	G15	G16	G17	G18	G19	G20	G21		
CHEX20	EID	PID	G1	G2	G3	G4	G5	G6	
+	G7	G8	G9	G10	G11	G12	G13	G14	
+	G15	G16	G17	G18	G19	G20	G21		
CMASS1	EID	PID	G1	C1	G2	C2			
CMASS2	EID	M	G1	C1	G2	C2	PID		
CONM2	EID	G	CID	M	X1	X2	X3	Blank	
+	I11	I21	I22	I31	I32	I33			
CONM3	EID	PID	G						
CPENTA	EID	PID	G1	G2	G3	G4	G5	G6	
CQUAD4	EID	PID	G1	G2	G3	G4	THETA	ZOFFS	
CROD	EID	PID	G1	G2					
CSHEAR	EID	PID	G1	G2	G3	G4			
CTETRA	EID	PID	G1	G2	G3	G4			
Alternate Format									
CTETRA	EID	PID	G1	G2	G3	G4	G5	G6	
+	G7	G8	G9	G10					
CTRIA3	EID	ID	G1	G2	G3	THETA	ZOFFS		
CTRIAX6	EID	PID	G1	G2	G3	G4	G5	G6	
+	TH								
CVISC	EID	PID	G1	G2					
CVECTOR	EID	PID	GA	GB	G0/X1	X2	X3		
CWELD	EID	PID	GS	"PARTPAT"	GA	GB			
+	PIDA	PIDB							
+	XS	YS	ZS						
Alternate Formats									
CWELD	EID	PID	GS	"ELPAT"	GA	GB			
+	SHIDA	SHIDB							
+	XS	YS	ZS						
CWELD	EID	PID	GS	"ELEMID"	GA	GB			
+	SHIDA	SHIDB							
CWELD	EID	PID	GS	"GRIDID"	GA	GB	SPTYP		
+	GA1	GA2	GA3	GA4					
+	GB1	GB2	GB3	GB4					
CWELD	EID	PID		"ALIGN"	GA	GB			
GENEL	EID		GI1	CI1	GI2	CI2	GI3	CI3	
+	GI4	CI4	GI5	CI5	-etc.-				
+	"UD"		GD1	CD1	GD2	CD2	-etc.-		
+	"K" or "Z"	KZ11	KZ21	KZ31	-etc.-	KZ22	KZ32	.	
+	-etc.-		KZ33	KZ43	-etc.-				
+	"S"	S11	S12	-etc.-		s21	-etc.-		

RIGID/INTERPOLATION ELEMENTS

RBAR	EID	GA	GB	CNA	CNB	CMA	CMB		
RBE1	EID	GN1	CN1	GN2	CN2	GN3	CN3		
+		GN4	CN4	GN5	CN5	GN6	CN6		
+	“UM”	GM1	CM1	GM2	CM2	GM3	CM3		
+		GM4	CM4	-etc.-					
RBE2	EID	GN	CM	GM1	GM2	GM3	GM4	GM5	
+	GM6	GM7	GM8	-etc.-					
RBE3	EID		REFGRID	REFC	WT1	C1	G1,1	G1,2	
+	G1,3	WT2	C2	G2,1	G2,2	-etc.-	WT3	C3	
+	G3,1	G3,2	-etc.-	WT4	C4	G4,1	G4,2	-etc.-	
+	“UM”	GM1	CM1	GM2	CM2	GM3	CM3		
+		GM4	CM4	GM5	CM5	-etc.-			
RROD	EID	GA	GB	CMA	CMB				
RSPLINE	EID	D/L	G1	G2	C2	G3	C3	G4	
+	C4	G5	C5	G6	-etc.-				

PROPERTIES

PAXIS	PID	MID	PMULT						
PBAR	PID	MID	A	I1	I2	J	NSM		
+	C1	C2	D1	D2	E1	E2	F1	F2	
+	AS1/K1	AS2/K2	I12						
PBARL	PID	MID	LIBRARY	TYPE					
+	d1	d2	d3	d4	d5	-etc.-	NSM		
PBEAM	PID	MID	A(A)	I1(A)	I2(A)	I12(A)	J(A)	NSM(A)	
+	C1(A)	C2(A)	D1(A)	D2(A)	E1(A)	E2(A)	F1(A)	F2(A)	
+	S0	X/XB	A	I1	I2	I12	J	NSM	
+	C1	C2	D1	D2	E1	E2	F1	F2	
+	K1	K2			NSI(A)	NSI(B)	CW(A)	CW(B)	
+	M1(A)	M2(A)	M1(B)	M2(B)	N1(A)	N2(A)	N1(B)	N2(B)	
PBEAML	PID	MID	LIBRARY	TYPE					
	d1(A)	d2(A)	etc	dn(A)	NSM(A)	S0(1)	X1(1)/XB	d1(1)	
	d2(1)	etc.	dn(1)	NSM(1)	S0(2)	X(2)/XB	d1(2)	d2(2)	
	etc	dn(2)	NSM(2)	et	S0(m)	X(m)/XB	d1(m)	d2(m)	
	etc	dn(m)	NSM(m)c	S0(B)	1.0	d1(B)	etc	NSM(B)	
PBUSH	PID	“K”	K1	K2	K3	K4	K5	K6	
+		“B”	B1	B2	B3	B4	B5	B6	
+		“GE”	GE						
+		“RCV”	ST	SR	ET	ER			
PCOMP	PID	Z0	NSM	Blank	FAILURE	TREF	GE	LAM	MEM
+	MID1	T1	THETA1	SOUT1	MID2	T2	THETA2	SOUT2	Blank
+	MID3	T3	THETA3	SOUT3	-etc.-				Blank
PCONM3	PID	CID	M	X1	X2	X3			
+	I11	I21	I22	I31	I32	I33			
PDAMP	PID	B	PID	B	PID	B	PID	B	
PELAS	PID	K	GE	SRC	PID	K	GE	SRC	
PELASH	PID	K	Blank	Blank	PID	K			
PGAP	PID	U0		KA	KB	KT	MU1	MU2	
PHBDY	PID	MID	AF	Blank	ALPHA	D1	D2		
PK2UU	PID	KMULT							
PM2UU	PID	MMULT							
PMASS	PID	M	PID	M	PID	M	PID	M	
PROD	PID	MID	A	Blank	Blank	NSM			
PSHEAR	PID	MID	T	NSM					
PSHELL	PID	MID1	T	MID2	D/DF	MID3	TS/TSF	NSM	
+	Z1	Z2			SCSID				
PSOLID	PID	MID	CORDM						
PVECTOR	PID	K11	K12	K13	K14	K15	K16	K22	
+	K23	K24	K25	K26	K33	K34	K35	K36	
+	K44	K45	K46	K55	K56	K66	G2		
PVISC	PID	C1	C2	Blank	PID	C1	C2		
PWELD	PID	MID	D					TYPE	
+	LDMIN	LDMAX							

MATERIALS

MAT1	MID	E	G	NU	RHO	A	TREF	GE	
+	ST	SC	SS						
MAT2	MID	G11	G12	G13	G22	G23	G33	RHO	
+	A1	A2	A12	T0	GE	ST	SC	SS	
MAT3	MID	EX	E0	EZ	NUXθ	NU0Z	NUZX	RHO	
+	Blank	Blank	GZX	AX	Aθ	AZ	TREF	GE	
MAT4	MID	K							
MAT5	MID	KXX	KXY	KXZ	KYY	KYZ	KZZ		
MAT8	MID	E1	E2	v12	G12	G1,Z	G2,Z	RHO	
+	A1	A2	TREF	XT	XC	YT	YC	S	
+	GE	F12	STRN						
MAT9	MID	G11	G12	G13	G14	G15	G16	G22	
+	G23	G24	G25	G26	G33	G34	G35	G36	
+	G44	G45	G46	G55	G56	G66	RHO	A1	
+	A2	A3	A4	A5	A6	TREF	GE		

COMPOSITE FAILURE INDEX EQUATIONS

FINDEX	EQID	EQUATION
FINDEXN	EQID	EQUATION

NONSTRUCTURAL MASSES

NSM	SID	TYPE	PID1	VALUE1	PID2	VALUE2	PID3	VALUE3	
NSM1	SID	TYPE	VALUE	PID1	PID2	PID3	PID4	PID5	
+	PID6	PID7	PID8	-etc.-					
NSMADD	SID	SID1	SID2	SID3	SID4	SID5	SID6	SID7	
+	SID8	SID9	-etc.-						
NSML	SID	TYPE	PID1	VALUE1	PID2	VALUE2	PID3	VALUE3	
NSML1	SID	TYPE	VALUE	PID1	PID2	PID3	PID4	PID5	
+	PID6	PID7	PID8	-etc.-					

EIGENVALUES

EIGR	SID	METHOD	V1	V2		ND	NORM		
+	MODE	G1	C	Blank	MODE	G2	C	Blank	
+	MODE	G3	C	Blank	-etc.-				
EIGRL	SID	V1	V2	ND		MAXSET		NORM	

STATIC LOADS

DEFORM	SID	EID1	DEF1	EID2	DEF2	EID3	DEF3		
LOAD	SID	S	S1	SID1	S2	SID2	S3	SID3	
+	S4	SID4	-etc.-						
FORCE	SID	G	CID	F	N1	N2	N3		
FORCE1	SID	G	F	G1	G2				
GRAV	SID	CID	G	N1	N2	N3			
MOMENT	SID	G	CID	M	N1	N2	N3		
MOMENT1	SID	G	M	G1	G2				
PLOAD1	SID	EID	TYPE	SCALE	X1	P1	X2	P2	
PLOAD2	ID	P	EID	EID	EID	EID	EID	EID	
+	EID	-etc.-							
PLOAD4	SID	EID	P	Blank	Blank	Blank	G1	G3 or G4	
+	CID	N1	N2	N3					
Alternate Format									
PLOAD4	SID	EID	P	Blank	Blank	Blank	“THRU”	EID2	
+	CID	N1	N2	N3					
PLOAD5	SID	EID1	P	Blank	Blank	Blank	“THRU”	EID2	
+	CID	N1	N2	N3					
PLOADA	SID	EID	CID	X1	X2	X3	PA	PB	
PLOADX1	SID	EID	PA	PB	GA	GB	THETA		
RFORCE	SID	GID	CID	A	N1	N2	N3		
+	ACC								
TEMP	SID	G	T	G	T	G	T		

DYNAMIC LOADS

DAREA	SID	P	C	AREA	P	C	AREA		
DELAY	SID	P	C	DELAY	P	C	DELAY		
DPHASE	SID	P	C	PHASE	P	C	PHASE		
FREQ	SID	F	F	F	-etc.-				
FREQ1	SID	F1	DF	NDF					
FREQ2	SID	F1	F2	NF					
RLOAD1	SID	DAREA	DELAY	DPHASE	TC	TD	LSID	GSID	
RLOAD2	SID	DAREA	DELAY	DPHASE	TB	TP	LSID	GSID	
RLOAD3	SID	GID	C	AREA					
TABDMP1	ID	TYPE							
+	F1	G1	F2	G2	F3	G3	-etc.-		
TABLED1	ID								
+	x1	y1	x2	y2	x3	y3	-etc.-		
TABLED2	ID	X1							
+	x1	y1	x2	y2	x3	y3	-etc.-		
TABLED3	ID	X1	X2						
+	x1	y1	x2	y2	x3	y3	-etc.-		
TABLED4	ID	X1	X2	X3	X4				
+	A0	A1	A2	A3	A4	-etc.-			

RANDOM LOADS AND TIME LAGS

RANDPS	SID	J	K	X	Y	TID			
RANDT1	SID	N	T0	TMAX					
TABRND1	TID								
+	F1	G1	F2	G2	F3	G3	-etc.-		

HEAT TRANSFER LOADS

QBDY1	SID	Q0	EID1	EID2	EID3	EID4	EID5	EID6	
Alternate Form									
QBDY1	SID	Q0	EID1	THRU	EID2				
QBDY2	SID	EID	QQ01	Q02	Q03	Q04			
QHBDY	SID	FLAG	Q0	AF	G1	G2	G3	G4	
QVECT	SID	Q0	E1	E2	E3	EID1	EID2	EID3	
+	EID4	EID5	-etc.-						
Alternate Format									
QVECT	SID	Q0	E1	E2	E3	EID1	THRU	EID2	
QVOL	SID	QV	EID1	EID2	EID3	EID4	EID5	EID6	
Alternate Format									
QVOL	SID	QV	EID1	THRU	EID2				

DIRECT MATRIX INPUT

Header Format:									
DMIG	NAME	0	FORM	TYPE		POLAR		NCOL	
Column Format for FORM=6:									
DMIG	NAME	GJ	CJ	TYPE	G1	C1	A1	B1	
	G2	C2	A2	B2	G3	C3	A3	B3	
	G4	C4	A4	B4	-etc.-				
Column Format for FORM=9:									
DMIG	NAME	COLJ			G1	C1	A1		
	G2	C2	A2		G3	C3	A3		
	G4	C4	A4		-etc.-				

TOPOLOGY OPTIMIZATION DATA

Topology optimization data is used to: a) define the regions where the user wants to study which elements are relevant to keep or not, b) select the relevant responses to be used as constraints or the objective function, and c) enforce fabrication constraints.

TOPOLOGY REGIONS

TPROP	ID	PID	RULE	INIT	TMIN	DELT	DTMIN	TSYMID	Blank
+	RV1	RV2	RV3						

FABRICATION CONSTRAINTS

TSYM1	ID	G1	G2	G3	n				
+	TYPE1	TYPE2	TYPE3						
+	SYMV1	SYMV2							
+	STHICK	PUNCH	VOIDDNS	OFFSET					
TSYM2	ID	RID	A1	A2	A3	B1	B2	B3	
+	C1	C2	C3	n					
+	TYPE1	TYPE2	TYPE3						
+	SYMV1	SYMV2							
+	STHICK	PUNCH	VOIDDNS	OFFSET					
TSYM3	ID	CID	n						
+	TYPE1	TYPE2	TYPE3						
+	SYMV1	SYMV2							
+	STHICK	PUNCH	VOIDDNS	OFFSET					

RESPONSES

TRESP1	RID	LABEL	RTYPE	PTYPE		ATTA	ATT1	etc	
TRESP2	RID	LABEL	EQID	REGION					
+	"TVAR"	NDV1	NDV2	NDV3	NDV4	NDV5	NDV6	NDV7	NDV8
+	Blank	NDV9	NDV10	-etc.-					
+	"DTABLE"	NC1	NC2	NC3	NC4	NC5	NC6	NC7	NC8
+	Blank	NC9	NC10	-etc.-					
+	"TRESP1"	NR1	NR2	NR3	NR4	NR5	NR6	NR7	NR8
+	Blank	NR9	NR10	-etc.-					
+	"TRESP1L"	NR1	LID1	NR2	LID2	NR3	LID3	NR4	LID4
+	Blank	NR5	LID5	-etc.-					
TRESP3	RID	LABEL	SUBID or NAME	REGION					
+	"TVAR"	NDV1	NDV2	NDV3	NDV4	NEV5	NDV6	NDV7	NDV8
+	Blank	NDV9	NDV10	-etc.-					
+	"DTABLE"	NC1	NC2	NC3	NC4	NC5	NC6	NC7	NC8
+	Blank	NC9	NC10	-etc.-					
+	"TRESP1"	NR1	NR2	NR3	NR4	NR5	NR6	NR7	NR8
+	Blank	NR9	NR10	-etc.-					
+	"TRESP1L"	NR1	LID1	NR2	LID2	NR3	LID3	NR4	LID4
+	Blank	NR5	LID5	-etc.-					

EQUATION UTILITY

DEQATN	EQID	EQUATION							
DTABLE	LABL1	VALU1	LABL2	VALU2	LABL3	VALU3	LABL4	VALU4	Blank
+	LABL5	VALU5	LABL6	VALU6	-etc.-				Blank

OBJECTIVE FUNCTION

TOBJ	RID	LABEL	LID	MIN/MAX					
TINDEX	RID1	LID1	WT1	RID2	LID2	WT2	RID3	LID3	WT3
+	RID4	LID4	WT4	-etc.-					

CONSTRAINTS

TCONS	RID	LID1	LB1	UB1	LID2	LB2	UB2		
+		LID3	LB3	UB3	-etc.-				
TCONS2	RID	LID1	LBF1	UBF1	LID2	LBF2	UBF2		
+		LID3	LBF3	UBF3	-etc.-				

TOPOLOGY EXTRA VARIABLES

TVAR	ID	LABEL	INIT	LB	UB	DELX	DXMIN		

SHAPE AND SIZING OPTIMIZATION DATA

DESIGN VARIABLES

DVAR	ID	LABEL	INIT	LB	UB	DELX	DXMIN		
+	DVSID								
DLINK	DVID	C0	CMULT	DV1	C1	DV2	C2	DV3	C3
+	DV4	C4	-etc.-						Blank
DVSET	SID	VAL1	VAL2	VAL3	VAL4	VAL5	VAL6	VAL7	VAL8
+	VAL9	VAL10	-etc.-						
DVSET1	SID	VAL1	VAL2	INCRE	NI				

DESIGN VARIABLE/PROPERTY RELATIONSHIPS (Sizing/Topometry)

DVPROP1	ID	PID	FID	CO	PMIN	DELP	DPMIN		
+	DVID1	C1	DVID2	C2	-etc.-				Blank
DVPROP2	ID	PID	FID	EQID	PMIN	DELP	DPMIN		
+	"DVAR"	DVID1	DVID2	DVID3	DVID4	DVID5	DVID6	DVID7	DVID8
+	Blank	DVID9	-etc.-						
+	"DTABLE"	CID1	CID2	CID3	CID4	CID5	CID6	CID7	CID8
+	Blank	CID9	-etc.-						
DVPROP3	ID	PID	ELTYPE	ISHEAR	PMIN	DELP	DPMIN	Blank	Blank
+	CSD1	CSD2	CSD3	CSD4	CSD5	CSD6	CSD7	CSD8	CSD9
+	CSD10	-etc.-							
DVPROP4	ID	PID	blank	PMIN-T	DELP-T	DPMIN-T	PMIN-A	DELP-A	DPMIN-A
+	LABEL1	TCO1	TDV1	TCOEF1	ACO1	ADV1	ACOEF1		
+	LABEL2	TCO2	TDV2	TCOEF2	ACO2	ADV2	ACOEF2		
+	-etc.-								
DLIB	LIBID	TYPE	NCSD	NSP	NSPS	NSTR			
+	SP1	SP2	SP3	SP4	SP5	SP6			
DSPLIT	ID	LABEL	PTYPE	PID					
+	"PLINK"	PID1	PID2	PID3	PID4	PID5	PID6	PID7	PID8
+	Blank	PID9	PID10	-etc.-					
+	"COARSE"	CTYPE	CVALUE						
+	"SYM"	CID	TYPE1	TYPE2	TYPE3	n	SYMTOL	SYMMET	ANGTYPE
+	"NDVAR"	NDV1	NDV2	NDV3	NDV4	NEV5	NDV6	-etc.-	
+	"DVAR"	DV1	DV2	DV3	DV4	DV5	DV6	-etc.-	

DESIGN VARIABLE/GRID RELATIONSHIPS (Shape/Topography)

DOMAIN	ID								
+	TYPE	CG1	CG2	CG3	CG4	CG5	CG6	CG7	CG8
+	DGRID	G1	G2	G3	G4	G5	G6	G7	G8
+		G9	G10	-etc.-					
+	DVAR	DV1	DV2	DV3	DV4	DV5	DV6	DV7	DV8
+		DV9	DV10	-etc.-					
Alternate Format									
DOMAIN	ID								
+	TYPE	CG1	CG2	CG3	CG4	CG5	CG6	CG7	CG8
+	GSET	SETID							
+	DVAR	DV1	DV2	DV3	DV4	DV5	DV6	DV7	DV8
+		DV9	DV10	-etc.-					
DSHAPE	DVARID	LABEL	SPLIT	FTYPE	MAXPERT	RINIT	SCALE		
+	"SYM"	CID	TYPE1	TYPE2	TYPE3	n			
+	"COARSE"	CTYPE	DIMEN1						
+	"GRIDFR"	FRACT	BTYPE	GFRTOL					
DTGRID	ID	LABEL	PTYPE	PID	EDGEM	PERTM	SOLM	RINIT	
+	"SHAPE"	STYPE	DIMEN1	DIMEN2	DIMEN3				
+	"SYM"	CID	TYPE1	TYPE2	TYPE3	n			
+	"DVAR"	INIT	LB	UB	DELX	DXMIN			
+	"PERT"	GID	CID	COEFF	PX/G1	PY/G2	PZ/G3		
+	"DGRID"	DGID1	DGID2	DGID3	DGID4	DGID5	DGID6	DGID7	DGID8
+		DGID9	-etc.-						
+	"DGSET"	DSETID							
+	"NDGRID"	NDGID1	NDGID2	NDGID3	NDGID4	NDGID5	NDGID6	NDGID7	NDGID8
+		NDGID9	-etc.-						
+	"NDGSET	NDSETID							
+	"BEADFR	FRACT	BTYPE	TOL					

DVGRID	DVID	GID	CID	COEFF	N1	N2	N3	BASIS	
DVGRIDC	DVID	GID	CID	COEFF	N1	N2	N3	BASIS	
Alternate Format									
DVGRIDC	DVID	GID	Blank	COEFF	G1	G2			

RESPONSES

DRESP1	ID	LABEL	RTYPE	PTYPE	REGION	ATTA	ATT1	ATT2	ATT3
+	ATT4	-etc.-							
DRESP2	ID	LABEL	EQID	REGION					
+	"DVAR"	NDV1	NDV2	NDV3	NDV4	NDV5	NDV6	NDV7	NDV8
+	Blank	NDV9	NDV10	-etc.-					
+	"DTABLE"	NC1	NC2	NC3	NC4	NC5	NC6	NC7	NC8
+	Blank	NC9	NC10	-etc.-					
+	"DGRID"	NG1	NGC1	NG2	NGC2	NG3	NGC3	NG4	NGC4
+	Blank	NG5	NGC5	-etc.-					
+	"DRESP1"	NR1	NR2	NR3	NR4	NR5	NR6	NR7	NR8
+	Blank	NR9	NR10	-etc.-					
+	"DRESP1L"	NR1	LID1	NR2	LID2	NR3	LID3	NR4	LID4
+	Blank	NR5	LID5	-etc.-					
DRESP3	ID	LABEL	SUBID or NAME	REGION					
+	"DVAR"	NDV1	NDV2	NDV3	NDV4	NEV5	NDV6	NDV7	NDV8
+	Blank	NDV9	NDV10	-etc.-					
+	"DTABLE"	NC1	NC2	NC3	NC4	NC5	NC6	NC7	NC8
+	Blank	NC9	NC10	-etc.-					
+	"DGRID"	NG1	NGC1	NG2	NGC2	NG3	NGC3	NG4	NGC4
+	Blank	NG5	NGC5	-etc.-					
+	"DRESP1"	NR1	NR2	NR3	NR4	NR5	NR6	NR7	NR8
+	Blank	NR9	NR10	-etc.-					
+	"DRESP1L"	NR1	LID1	NR2	LID2	NR3	LID3	NR4	LID4
+	Blank	NR5	LID5	-etc.-					
DRESPG	ID	LABEL	RTYPE	Blank	Blank	Blank	ATT1	ATT2	ATT3
+	ATT4	-etc.-							
DRESPU	ID	LABEL	LBOUND	UBOUND					

EQUATION UTILITY

DEQATN	EQID	EQUATION							
DTABLE	LABL1	VALU1	LABL2	VALU2	LABL3	VALU3	LABL4	VALU4	Blank
+	LABL5	VALU5	LABL6	VALU6	-etc.-				Blank

OBJECTIVE FUNCTION

DOBJ	RID	LABEL	LID	MIN/MAX					
DINDEX	RID1	LID1	WT1	RID2	LID2	WT2	RID3	LID3	WT3
+	RID4	LID4	WT4	-etc.-					
DMATCH	RID1	LID1	T1	RID2	LID2	T2	RID3	LID3	T3
+	RID4	LID4	T4	-etc.-					
DMATCH2	RID1	LID1	T1	WEIGHT1	RID2	LID2	T2	WEIGHT2	
+	RID3	LID3	T3	WEIGHT3	-etc.-				

CONSTRAINTS

DCONS	RID	LID1	LB1	UB1	LID2	LB2	UB2	Blank	Blank
+	Blank	LID3	LB3	UB3	-etc.-			Blank	Blank
DCONS2	RID	LID1	LBF1	UBF1	LID2	LBF2	UBF2	Blank	Blank
+	Blank	LID3	LBF3	UBF3	-etc.-			Blank	Blank
DSCREEN	TYPE	TRS	NSTR						

DESIGN VARIABLE SELECTION

DSELECT	ID	LABEL	FRACT	BTYPE	GTYPE	TOL			
+	"DVAR"	DV1	DV2	DV3	DV4	DV5	DV6	DV7	DV8
+	Blank	DV9	DV10	-etc.-					

OPTIMIZATION CONTROL

DOPT	DESMAX	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank
+	NAM1	VAL1	NAM2	VAL2	NAM3	VAL3	NAM4	VAL4	

ANALYSIS PARAMETERS (PARAM Bulk Data Statement)

Name	Default	Name	Default	Name	Default
AUTOSPC	NO	ITMXSS	50	PSMOOTH	OFF
BAILOUT	NO	KDAMP	1	RANDOM	0
COUPMASS	YES	LIMITLSF	NO *	RBE3SPC	NO
CB2	1.0	LOADCK	1	RESVEC	YES
CK2	1.0	MAXRATIO	1.0E+7	SEMPC	0
CK42	1.0	MIDSIDE	0	SHAPECK	4
CM2	1.0	MODSNS	0	SHELLCK	YES
CP2	1.0	MODTRK	NO	SMSMAX	*
EOF	NO *	MSMOOTH	OFF	SOLVER	1*
EPSEIG	1.0E-6	OPPTHK	0	SPCFTOL	1.0E-8
EPZERO	1.0E-8	OPPTHO	1	TAPELBL	1
FINDEXCK	YES	PLOADM	1	T3SRM	1
G	0.0	PCH2PST	NO	T6TOT3	0
GRDPNT	-1	PRGPST	YES	THETA	0.0
INREL	0	PRTMAXIM	YES	WTMASS	1.0
IRTOL	1.0E-6	PRTRESLT	YES		

Note: Some installations may set different defaults for parameters marked *

OPTIMIZATION PARAMETERS FOR TOPOLOGY (DOPT BULK DATA STATEMENT)

Name	Default	Name	Default	Name	Default
BDMEM	0.0	DELT	1.0E-6	ITMAX	100
CONV1	1.0E-3	DESMAX	15	ITRMOP	3
CONV2	1.0E-3	DNSHIS	0	METHOD	1
CONVCN	1.0E-3	DTMIN	0.2	OPTM	1
CONVDV	1.0E-4	FILTER	1	TINDEXM	0
DABOBJ	0.00001	GMAX	0.005	TMIN	0.0
DELOBJ	0.00001	IPRINT	0		

OPTIMIZATION PARAMETERS FOR SHAPE AND SIZING (DOPT Bulk Data Statement)

Name	Default	Name	Default	Name	Default
ADJOIN	-1	DVTOL	1.0E+35	OPOST	0
BASIS	no default	DXFRAC	1.0	OPTGRID	1
BDMEM	0.0	DXMIN	0.1	OPTHIS	0
CONV1	1.0E-3	FDCHMU	1.0E-6	OPTM	0 1 with topome-try/topography
CONV2	(DOBJ) 1.0E-3	FDCMU	1.0E-5	PTOL	1.0E+35
	(DMATCH) 1.0E-6	GMAX	0.005	RCOMPAPP	0 1 with STRDOT
CONVCN	1.0E-3	ICOMPAPP	0	RMATCH	0.01
CONVDV	(DOBJ) 1.0E-3	IMATCH	0	RPERT1	0.0
	(DMATCH) 1.0E-6	IPRINT	0	RPERT2	0.0
CONVLC	1.0E-3	ISHLAPP	1	RSHLAPP	0 1 with STRDOT
CONVPR	1.0E-3		0 with DSPLIT	SGENEL	0
DELP	0.5	ISDMAX	0	SHAPECN	2
DELX	0.5	ISRMAX	3	SK2UU	0
DESMAX	10	ISRMET	0	SM2UU	0
DINDEXM	0	ITMAX	100	STRDOT	0
DPMIN	0.1	ITRMOP	2	SYMMET	2
DR1MV	1	IUGRAD	0	SYMTOL	0.001
DVGTOL	0.1666667	LAMASMS	0	SYMTOL	0.001
DVINIT	0	MODAPP	0		

OPTIMIZATION PARAMETERS FOR DISCRETE DESIGN VARIABLES (DOPT Bulk Data Statement)

Name	Default	Name	Default	Name	Default
DDAMIN	0.1	DDELA	0.5	DSTART	-1
DDCMIN	0.1	DDELC	0.5	DVINIT2	0
DDLMIN	0.1	DDELL	0.5	IPEN	1
DDPMIN	0.1	DDELP	0.5	NDISCR	1
		DSCDOT	0	PENLTD	100000.0
				PMULTD	5.0

GENESIS FILES

INFORMATION	FILE NAME
Input Data	*file*.dat
Output Data	*file*.out
Run Log	*file*.log
Design History File	*pname*.HIS
Design Information File	*pname*.OPT
Updated Input File	*pname*UPDATE*xx*.dat
Post-Processing File	*pname*xx.*ext*
Sensitivity Post-Processing File	*pname*xx.SEN
Basis or Perturbation Post-Processing File	*pname*.DVG
DVAR and DVGRID Data Generated by DVSHAPE	*pname*.DVS
DVAR and DVGRID Data Generated by DVBASIS	*pname*.DVB
Shape Post-Processing File	*pname*.SHP
AUTORIB Output File	*pname*.RIB
Topology (density) history result File	*pname*.DNS
Topology (density) result per design cyle File	*pname*DENSxx.*ext*
Topology isodensity File	*pname*TSURF*xx*..dat
Shell to solid File	*pname*SSOL*xx*..dat
Sizing Post-Processing File	*pname*OPOST*xx*..*ext*
Reduced Matrices File	*pname*.DMIG
Guyan Reduced Stiffness Matrices File	*pname*xxyy.KAA
Guyan reduced Mass Matrices File	*pname*xxyy.MAA
Sensitivities of Guyan Reduced Stiffness Matrices File	*pname*xxyy.SKA
Sensitivities of Guyan Reduced Mass Matrix	*pname*xxyy.SMA
Objective and Maximum Constraint Violation Postscript Graph	*pname*.ps

xx = Design Cycle, yy = LOADCASE Number, ext = pch, op2, unv or PST

DESIGNABLE PROPERTIES

PBUSH - CBUSH element properties.

FID	INFORMATION
1-6	K1 - K6
7-12	B1 - B6
13	GE
14	ST Stress recovery coeff. for translational components
15	SR Stress recovery coeff. for rotational components
16	ET Strain recovery coeff. for translational components
17	ER Strain recovery coeff. for rotational components

PELAS - Elastic element properties.

FID	INFORMATION
1	The elastic element stiffness.
2	The elastic element stress recovery coefficient.
3	The structural damping coefficient.

PELASH - Scalar conduction element properties.

FID	INFORMATION
1	The element conduction coefficient.

PDAMP - Scalar damping element properties.

FID	INFORMATION
1	The element damping coefficient.

PMASS - Scalar mass element properties.

FID	INFORMATION
1	The element mass.

PVISC - Viscous damper element properties.

FID	INFORMATION
1	The extensional damping coefficient.
2	The rotational damping coefficient.

PROD - Rod element properties.

FID	INFORMATION
1	Rod element area.
2	Nonstructural mass per unit length.

PBAR - Bar element properties.

FID	INFORMATION
1	Nonstructural mass per unit length.
2	Beam element area.
3	Torsional constant.
4	I1 area moment of inertia (I_{zz}).
5	I2 area moment of inertia (I_{yy}).
6	I12 area moment of inertia.
7	AS1 shear area for plane 1 (ASy).
8	AS2 shear area for plane 2 (ASz).
9	C1 stress recovery coefficient.
10	C2 stress recovery coefficient.
11	D1 stress recovery coefficient.
12	D2 stress recovery coefficient.
13	E1 stress recovery coefficient.
14	E2 stress recovery coefficient.
15	F1 stress recovery coefficient.
16	F2 stress recovery coefficient.

PSHELL - Shell element properties.

FID	INFORMATION
1	Nonstructural mass per unit area.
2	Plate/Shell element thickness.
3	Plate/Shell element bending stiffness.
4	Plate/Shell element shear thickness.
5	Negative stress fiber distance (Z1).
6	Positive stress fiber distance (Z2).

PCONM3 - Mass element properties.

FID	INFORMATION
1	X component of offset vector.
2	Y component of offset vector.
3	Z component of offset vector.
4	Mass value.
5	I11 value.
6	I21 value.
7	I22 value.
8	I31 value.
9	I32 value.
10	I33 value.

PSHEAR - Shear panel element properties.

FID	INFORMATION
1	Nonstructural mass per unit area.
2	Element thickness.
3	F1 extensional stiffness parameter.
4	F2 extensional stiffness parameter.

PCOMP - Composite element properties.

FID	INFORMATION
3	Nonstructural mass per unit area.
4	Z0.
7	GE.
100+i	Thickness of layer i.
500+i	Angle of layer i.

PHBDY - CHBDY element properties.

FID	INFORMATION
1	Area factor.
2	D1 diameter.
3	D2 diameter.
4	Absorbtivity.

PAXIS / PK2UU / PM2UU - Axisymmetric element / user element properties.

FID	INFORMATION
1	Element property multiplier.

PVECTOR - CVECTOR element properties.

FID	INFORMATION
1-6	K11 - K16
7-11	K22 - K26
12-15	K33 - K36
16-18	K44 - K46
19-20	K55 - K56
21	K66
22	GE

FUNDAMENTAL RESPONSES

Displacement, velocity, acceleration

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	DISP			comp[s]	gid	gid	. . .
DRESP1	respid	label	DISP			comp[s]	ALL		
DRESP1	respid	label	DDISP			comp	gid	gid	. . .
DRESP1	respid	label	MDISP			comp	gid	gid	. . .
DRESP1	respid	label	DVELO			comp	gid	gid	. . .
DRESP1	respid	label	MVELO			comp	gid	gid	. . .
DRESP1	respid	label	DACCE			comp	gid	gid	. . .
DRESP1	respid	label	MACCE			comp	gid	gid	. . .

User function of dynamic displacement, velocity, acceleration

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	UFDISP			comp	fieldid	fieldid	. . .
DRESP1	respid	label	UFVELO			comp	fieldid	fieldid	. . .
DRESP1	respid	label	UFACCE			comp	fieldid	fieldid	. . .

Stress:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	STRESS	[PROP]		strsic	pid	pid	. . .
DRESP1	respid	label	STRESS	ELEM		strsic	eid	eid	. . .
DRESP1	respid	label	DSTRESS	[PROP]		strsic	pid	pid	. . .
DRESP1	respid	label	DSTRESS	ELEM		strsic	eid	eid	. . .
DRESP1	respid	label	GSTRESS			strsic	gid	gid	. . .
DRESP1	respid	label	GSTRESS			strsic	ALL		
DRESP1	respid	label	DGSTRESS			strsic	gid	gid	. . .
DRESP1	respid	label	DGSTRESS			strsic	ALL		

Strain:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	STRAIN	[PROP]		strnic	pid	pid	. . .
DRESP1	respid	label	STRAIN	ELEM		strnic	eid	eid	. . .
DRESP1	respid	label	DSTRAIN	[PROP]		strnic	pid	pid	. . .
DRESP1	respid	label	DSTRAIN	ELEM		strnic	eid	eid	. . .

Force:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	FORCE	[PROP]		frcic	pid	pid	. . .
DRESP1	respid	label	FORCE	ELEM		frcic	eid	eid	. . .
DRESP1	respid	label	DFORCE	[PROP]		frcic	pid	pid	. . .
DRESP1	respid	label	DFORCE	ELEM		frcic	eid	eid	. . .

Composite Failure Index:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	FINDEX	[PROP]		1	pid	pid	-etc.-
DRESP1	respid	label	FINDEX	ELEM		1	eid	eid	-etc.-

Strain energy:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	SENERGY						

Frequency:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	FREQ	mode					
DRESP1	respid	label	RFREQ	mode					

Eigenvector:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	EVECT	mode		comp[s]	gid	gid	. . .
DRESP1	respid	label	EVECT	mode		comp[s]	ALL		
DRESP1	respid	label	REVECT	mode		comp[s]	gid	gid	. . .
DRESP1	respid	label	REVECT	mode		comp[s]	ALL		

Buckling Load Factor:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	LAMA	mode					

Temperature:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	TEMP				gid	gid	. . .
DRESP1	respid	label	TEMP				ALL		

Random Root Mean Square Dynamic Displacements, Velocities and Accelerations:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	RMSDISP			comp	gid	gid	. . .
DRESP1	respid	label	RMSVELO			comp	gid	gid	. . .
DRESP1	respid	label	RMSACCE			comp	gid	gid	. . .

Mass:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	MASS						
DRESP1	respid	label	MASS	MAT			mid	mid	. . .
DRESP1	respid	label	MASS	PROP			pid	pid	. . .

Volume:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	VOLUME						
DRESP1	respid	label	VOLUME	MAT			mid	mid	. . .
DRESP1	respid	label	VOLUME	PROP			pid	pid	. . .

System Inertia Properties:

1	2	3	4	5	6	7	8	9	10
DRESP1	respid	label	INERTIA			sysiic			

Geometric Responses:

1	2	3	4	5	6	7	8	9	10
DRESPG	respid	label	ANGLE				gid	gid	gid
DRESPG	respid	label	LENGTH				gid	gid	gid
+	. . .								
DRESPG	respid	label	AREA3				gid	gid	gid
+	. . .								
DRESPG	respid	label	AREA4				gid	gid	gid
+	gid	. . .							
DRESPG	respid	label	VOL4				gid	gid	gid
+	gid	. . .							
DRESPG	respid	label	VOL6				gid	gid	gid
+	gid	gid	gid	. . .					
DRESPG	respid	label	VOL8				gid	gid	gid
+	gid	gid	gid	gid	gid	. . .			
DRESPG	respid	label	DGLINE				gid	gid	gid
DRESPG	respid	label	DGPLANE				gid	gid	gid
+	gid								
DRESPG	respid	label	DIFFX				gid	gid	
DRESPG	respid	label	DIFFY				gid	gid	
DRESPG	respid	label	DIFFZ				gid	gid	
DRESPG	respid	label	DISTX				gid	gid	
DRESPG	respid	label	DISTY				gid	gid	
DRESPG	respid	label	DISTZ				gid	gid	

Topology Responses:

1	2	3	4	5	6	7	8	9	10
Displacements & Relative Displacements									
TRESP1	respid	label	DISP			comp	gid1	gid2	...
TRESP1	respid	label	RELDISP			comp	gid1	gid2	...
Strain Energy									
TRESP1	respid	label	SENERGY						
Frequency & Buckling Load Factors									
TRESP1	respid	label	FREQ	mode					
TRESP1	respid	label	LAMA	mode					
Mass Fraction & Inertia									
TRESP1	respid	label	MASSFR						
TRESP1	respid	label	MASSFR	PROP			pid		
TRESP1	respid	label	INERTIA			sysiic			
Direct and Modal Dynamic Displacements, Velocities and Accelerations									
TRESP1	respid	label	DDISP			comp	gid	gid	. . .
TRESP1	respid	label	MDISP			comp	gid	gid	. . .
TRESP1	respid	label	DVELO			comp	gid	gid	. . .
TRESP1	respid	label	MVELO			comp	gid	gid	. . .
TRESP1	respid	label	DACCE			comp	gid	gid	. . .
TRESP1	respid	label	MACCE			comp	gid	gid	. . .
Random Root Mean Square Dynamic Displacements, Velocities and Accelerations									
TRESP1	respid	label	RMSDISP			comp	gid	gid	. . .
TRESP1	respid	label	RMSVELO			comp	gid	gid	. . .
TRESP1	respid	label	RMSACCE			comp	gid	gid	. . .

DRESP1 / TRESP1 ITEM CODES

System Inertia Properties Item Codes (sysiic)

Item	Meaning
1	Ixx at center of mass
2	Iyy at center of mass
3	Izz at center of mass
4	Ixy at center of mass
5	Iyz at center of mass
6	Izx at center of mass
7	Principal 1 at center of mass
8	Principal 2 at center of mass
9	Principal 3 at center of mass
10	Ixx at grdpnt
11	Iyy at grdpnt
12	Izz at grdpnt
13	Ixy at grdpnt
14	Iyz at grdpnt
15	Izx at grdpnt
16	Principal 1 at grdpnt
17	Principal 2 at grdpnt
18	Principal 3 at grdpnt
20	Y center of mass (relative to grdpnt)
21	Z center of mass (relative to grdpnt)
22	X center of mass (relative to grdpnt)

DRESP1 ITEM CODES

Strain Item Codes (strnic)

Item				Meaning	
Static/Mag.	Phase	Real	Imaginary		
PBUSH					
1	7	13	19	Strain x = ET*(Ux2-Ux1)	
2	8	14	20	Strain y = ET*(Uy2-Uy1)	
3	9	15	21	Strain z = ET*(Uz2-Uz1)	
4	10	16	22	γ x = ER*(θx2-θx1)	
5	11	17	23	γ y = ER*(θy2-θy1)	
6	12	18	24	γ z = ER*(θz2-θz1)	
PSHELL (so = static only)					
so 1				Max shear at bottom surface	
so 2				von Mises of bottom surface	
so 3				Major principal of bottom surface	
so 4				Minor principal of bottom surface	
5	27	49	71	Epsilon-xx of bottom surface	
6	28	50	72	Epsilon-yy of bottom surface	
7	29	51	73	Gamma-xy of bottom surface	
so 8				Max shear at top surface	
so 9				von Mises of top surface	
so 10				Major principal of top surface	
so 11				Minor principal of top surface	
12	34	56	78	Epsilon-xx of top surface	
13	35	57	79	Epsilon-yy of top surface	
14	36	58	80	Gamma-xy of top surface	
15	37	59	81	Epsilon-xx of mid-plane	
16	38	60	82	Epsilon-yy of mid-plane	
17	39	61	83	Gamma-xy of mid-plane	
20	42	64	86	Kappa-xx of mid-plane	
21	43	65	87	Kappa-yy of mid-plane	
22	44	66	88	Kappa-xy of mid-plane	
PSOLID and PAXIS (so = static only)					
1	14	27	40	Epsilon-xx	(Epsilon-rr)
2	15	28	41	Epsilon-yy	(Epsilon-θθ)
3	16	29	42	Epsilon-zz	(Epsilon-zz)
4	17	30	43	Gamma-xy	(not for PAXIS)
5	18	31	44	Gamma-yz	(not for PAXIS)
6	19	32	45	Gamma-xz	(Gamma-zr)
so 7				von Mises	
so 8				Octehedral	
so 9				Max Shear	
so 10				Dilatation	
so 11				Principal 1	
so 12				Principal 2	
so 13				Principal 3	

Force Item Codes (frcic)

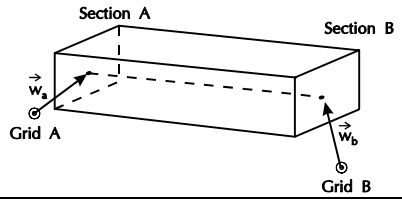
Item				Meaning
Static/Mag.	Phase	Real	Imaginary	
PELAS				
1	2	3	4	Element Force
PDAMP				
1	2	3	4	Element Force
PBUSH				
1	7	13	19	Element Force x
2	8	14	20	Element Force y
3	9	15	21	Element Force x
4	10	16	22	Element Moment x
5	11	17	23	Element Moment y
6	12	18	24	Element Moment z
PROD				
1	3	5	7	Axial Force at end A
2	4	6	8	Axial Force at end B
PVISC				
1	3	5	7	Axial Force
2	4	6	8	Torque
PBAR				
1	13	25	37	Axial force at end A
2	14	26	38	Shear in plane 1 at end A
3	15	27	39	Shear in plane 2 at end A
4	16	28	40	Torque at end A
5	17	29	41	Moment in plane 2 at end A
6	18	30	42	Moment in plane 1 at end A
7	19	31	43	Axial force at end B
8	20	32	44	Shear in plane 1 at end B
9	21	33	45	Shear in plane 2 at end B
10	22	34	46	Torque at end B
11	23	35	47	Moment in plane 2 at end B
12	24	36	48	Moment in plane 1 at end B
PSHELL				
1	9	17	25	N-xx (in scsid coordinates)
2	10	18	26	N-yy (in scsid coordinates)
3	11	19	27	N-xy (in scsid coordinates)
6	14	22	30	M-xx (in scsid coordinates)
7	15	23	31	M-yy (in scsid coordinates)
8	16	24	32	M-xy (in scsid coordinates)
PCOMP (so = static only)				
so 1				N-xx (in element coordinates)
so 2				N-yy (in element coordinates)
so 3				N-xy (in element coordinates)
so 6				M-xx (in element coordinates)
so 7				M-yy (in element coordinates)
so 8				M-xy (in element coordinates)
PSHEAR				
1	17	33	49	Force 4 to 1
2	18	34	50	Force 2 to 1
3	19	35	51	Force 1 to 2
4	20	36	52	Force 3 to 2
5	21	37	53	Force 2 to 3
6	22	38	54	Force 4 to 3
7	23	39	55	Force 3 to 4
8	24	40	56	Force 1 to 4
9	25	41	57	Kick force on 1
10	26	42	58	Shear 12
11	27	43	59	Kick force on 2
12	28	44	60	Shear 23
13	29	45	61	Kick force on 3
14	30	46	62	Shear 34
15	31	47	63	Kick force on 4
16	32	48	64	Shear 41
PVECTOR				
1	13	25	37	Force 1 at grid A
2	14	26	38	Force 2 at grid A
3	15	27	39	Force 3 at grid A
4	16	28	40	Moment 1 at grid A
5	17	29	41	Moment 2 at grid A
6	18	30	42	Moment 3 at grid A
7	19	31	43	Force 1 at grid B
8	20	32	44	Force 2 at grid B
9	21	33	45	Force 3 at grid B
10	22	34	46	Moment 1 at grid B
11	23	35	47	Moment 2 at grid B
12	24	36	48	Moment 3 at grid B

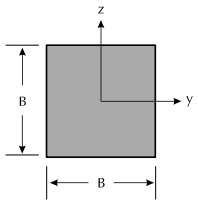
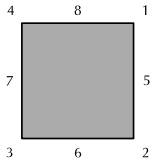
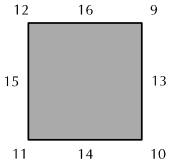
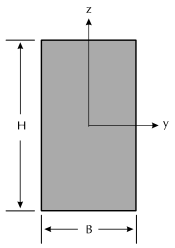
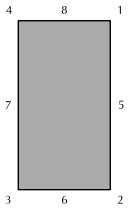
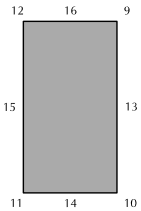
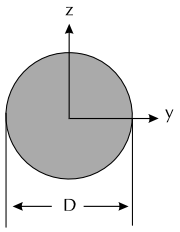
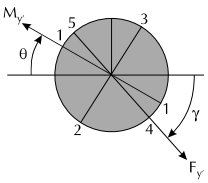
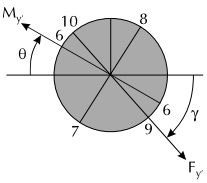
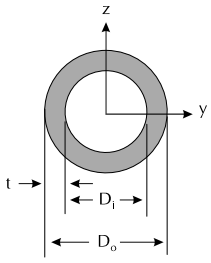
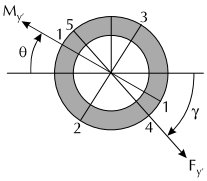
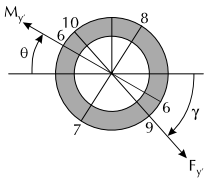
Stress Item Codes (strsic)

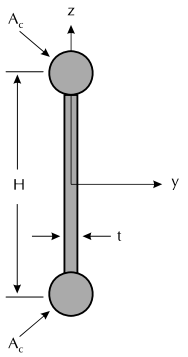
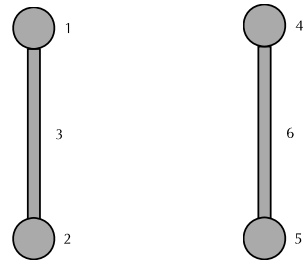
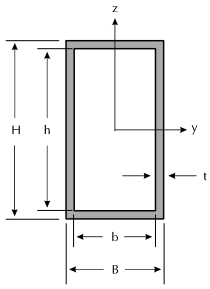
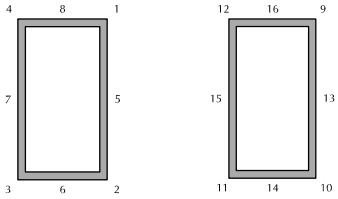
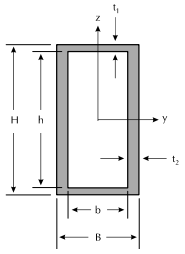
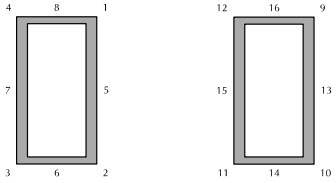
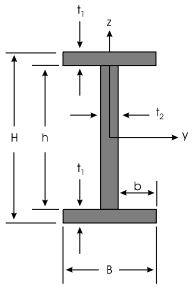
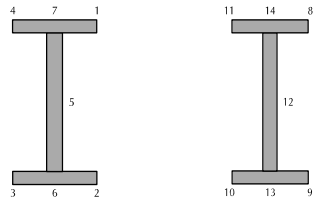
Item				Meaning
Static/Mag.	Phase	Real	Imaginary	
PELAS				
1	2	3	4	Element Stress (Force * SRC)
PBUSH				
1	7	13	19	Stress x = ST*Fx
2	8	14	20	Stress y = ST*Fy
3	9	15	21	Stress z= ST*Fz
4	10	16	22	τ x = SR*Mx
5	11	17	23	τ y = SR*My
6	12	18	24	τ z = SR*Mz
PROD				
1	3	5	7	Axial Stress at end A
2	4	6	8	Axial Stress at end B
PBAR (not using DVPROP3)				
1	9	17	25	Bending + Axial at point C of end A
2	10	18	26	Bending + Axial at point D of end A
3	11	19	27	Bending + Axial at point E of end A
4	12	20	28	Bending + Axial at point F of end A
5	13	21	29	Bending + Axial at point C of end B
6	14	22	30	Bending + Axial at point D of end B
7	15	23	31	Bending + Axial at point E of end B
8	16	24	32	Bending + Axial at point F of end B
PSHEAR				
1	7	13	19	Shear stress at grid point 1
2	8	14	20	Shear stress at grid point 2
3	9	15	21	Shear stress at grid point 3
4	10	16	22	Shear stress at grid point 4
5	11	17	23	Average shear stress
6	12	18	24	Maximum shear stress
PSHELL (so = static only)				
so 1				Max shear at bottom surface
so 2				von Mises of bottom surface
so 3				Major principal of bottom surface
so 4				Minor principal of bottom surface
5	19	33	47	Sigma-xx of bottom surface
6	20	34	48	Sigma-yy of bottom surface
7	21	35	49	Sigma-xy of bottom surface
so 8				Max shear at top surface
so 9				von Mises of top surface
so 10				Major principal of top surface
so 11				Minor principal of top surface
12	26	40	54	Sigma-xx of top surface
13	27	41	55	Sigma-yy of top surface
14	28	42	56	Sigma-xy of top surface
PCOMP (so = static only)				
so 1				Ply failure index (PF)
PSOLID, PAXIS and GSTRESS (so = static only)				
1	14	27	40	Sigma-xx (Sigma-rr)
2	15	28	41	Sigma-yy (Sigma-θθ)
3	16	29	42	Sigma-zz (Sigma-zz)
4	17	30	43	Sigma-xy (not for PAXIS)
5	18	31	44	Sigma-yz (not for PAXIS)
6	19	32	45	Sigma-xz (Sigma-zr)
so 7				von Mises
so 8				Octehedral
so 9				Max Shear
so 10				Mean Pressure
so 11				Principal 1
so 12				Principal 2
so 13				Principal 3

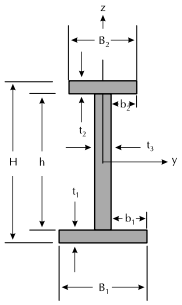
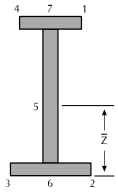
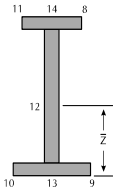
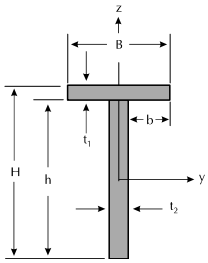
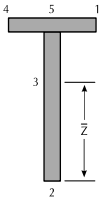
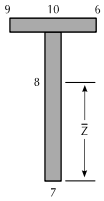
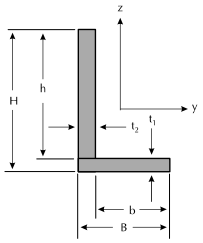
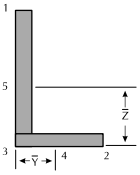
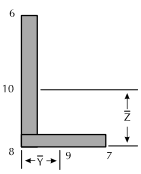
DVPROP3 PBAR/PSHELL LIBRARY

PBAR SECTIONS

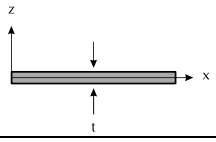
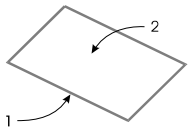
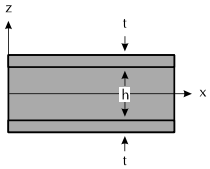
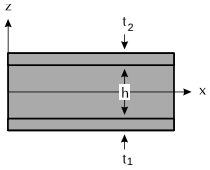
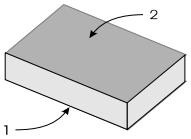


Name	Section	Design Variables	Stress Item Codes
Square		B	 Section A  Section B σ_x at 1, 2, 3, 4, 9, 10, 11, 12 τ_{xz} al 5, 7, 13, 15 τ_{xy} at 6, 8, 14, 16
Rect		B, H	 Section A  Section B σ_x at 1, 2, 3, 4, 9, 10, 11, 12 τ_{xz} al 5, 7, 13, 15 τ_{xy} at 6, 8, 14, 16
Circle		D	 Section A  Section B σ_x at 1, 2, 3, 6, 7, 8 $\tau_{xz'}$ at 4, 5, 9, 10
Tube		D_i, t	 Section A  Section B σ_x at 1, 2, 3, 6, 7, 8 $\tau_{xz'}$ at 4, 5, 9, 10

Name	Section	Design Variables	Stress Item Codes
Spar		A_c, H, t	 Section A Section B σ_x at 1, 2, 4, 5 τ_{xz} at 3, 6
Box3		b, t, h	 Section A Section B σ_x at 1, 2, 3, 4, 9, 10, 11, 12 τ_{xz} al 5, 7, 13, 15 τ_{xy} at 6, 8, 14, 16
Box4		b, t_1, h, t_2	 Section A Section B σ_x at 1, 2, 3, 4, 9, 10, 11, 12 τ_{xz} al 5, 7, 13, 15 τ_{xy} at 6, 8, 14, 16
Ibeam		b, t_1, h, t_2	 Section A Section B σ_x at 1, 2, 3, 4, 8, 9, 10, 11 τ_{xz} at 5, 12 τ_{xy} at 6, 7, 13, 14

Name	Section	Design Variables	Stress Item Codes
Rail		b_1, t_1, b_2, t_2, h, t_3	 Section A  Section B σ_x at 1, 2, 3, 4, 8, 9, 10, 11 τ_{xz} at 5, 12 τ_{xy} at 6, 7, 13, 14
Tee		b, t_1, h, t_2	 Section A  Section B σ_x at 1, 2, 3, 6, 7, 8 τ_{xz} at 4, 9 τ_{xy} at 5, 10
Angle		b, t_1, h, t_2	 Section A  Section B σ_x at 1, 2, 3, 6, 7, 8 τ_{xz} at 5, 10 τ_{xy} at 4, 9

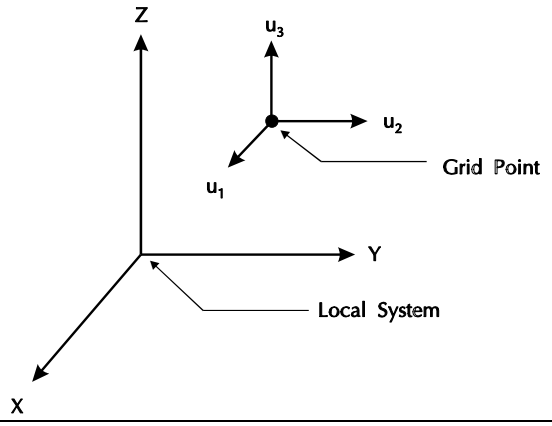
PSHELL SECTIONS

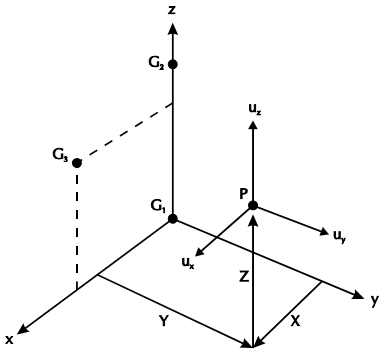
Name	Section	Design Variables	Stress Item Codes
Solid		t	
Sand		t, h	
Sand2		t_1, t_2, h	

Component	Surface 1 (Bottom)	Surface 2 (Top)
τ_{MAX}	1	8
σ_{VM}	2	9
σ_1	3	10
σ_2	4	11
σ_x	5	12
σ_y	6	13
τ_{xy}	7	14

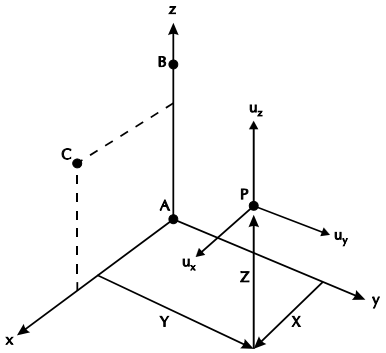
COORDINATE DATA

RECTANGULAR COORDINATE SYSTEM



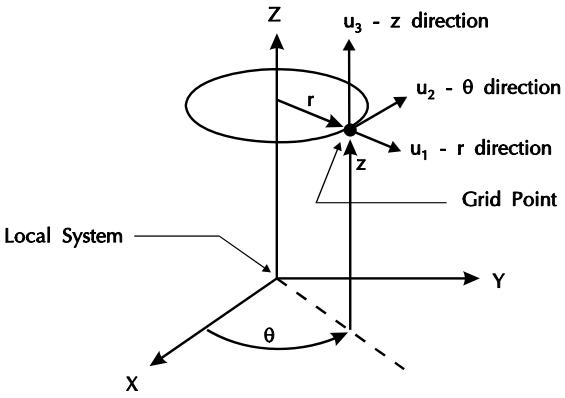


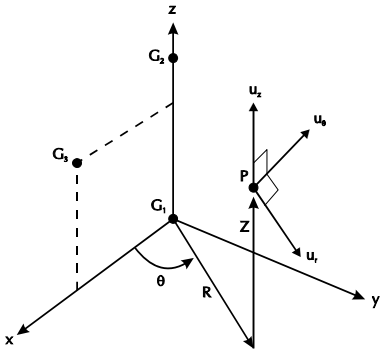
CORD1R



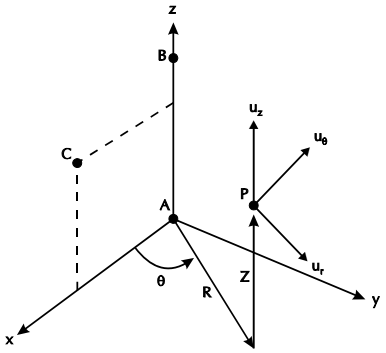
CORD2R

CYLINDRICAL COORDINATE SYSTEM



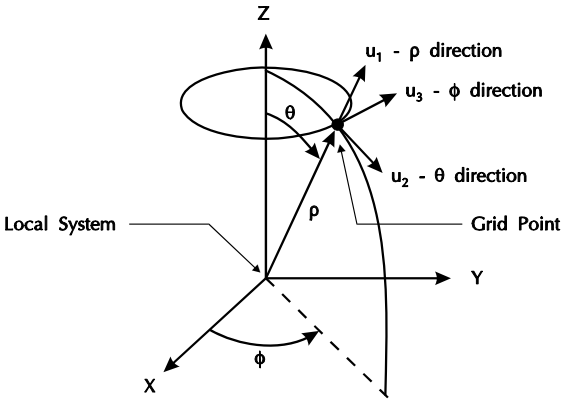


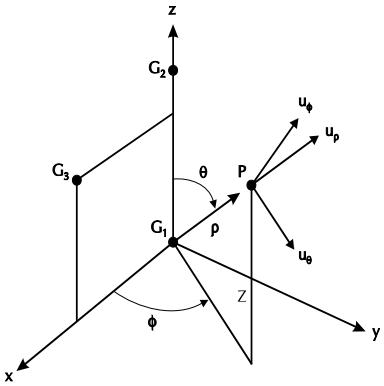
CORD1C



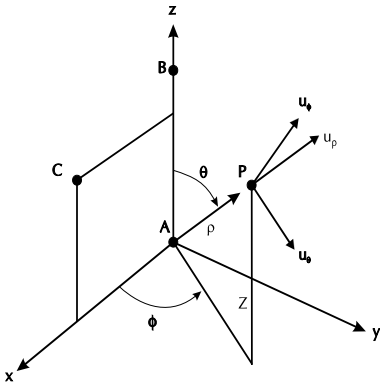
CORD2C

SPHERICAL COORDINATE SYSTEM



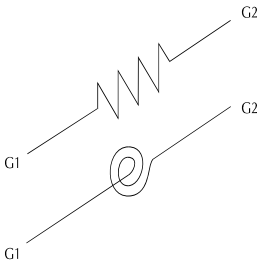
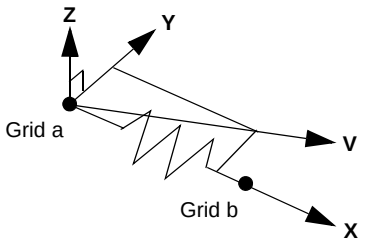
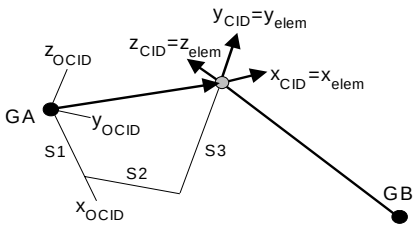
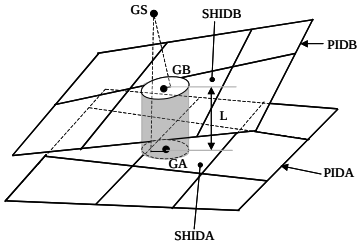
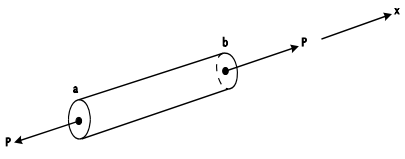


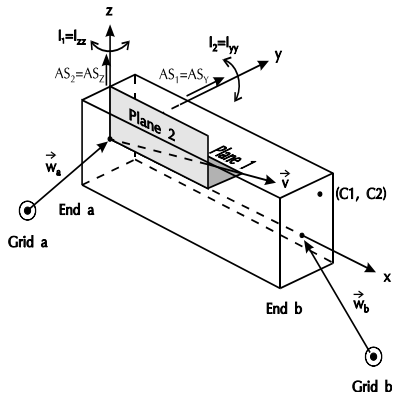
CORD1S



CORD2S

FINITE ELEMENT LIBRARY

CELAS1 → PELAS PELASH CELAS2	Elastic Element  	Analysis: Statics, Eigenvalues, Dynamics, Heat Properties: Stiffness, Conductivity, Damping Material: None Loads: None Responses: Forces, Stress
CVECTOR → PVECTOR	Vector  	Analysis: Statics, Eigenvalues, Dynamics Properties: Stiffness, Damping Material: None Loads: None Responses: Forces
CBUSH → PBUSH	Bushing Element  	Analysis: Statics, Eigenvalues, Dynamics Properties: Stiffness, Damping Material: None Loads: None Responses: Stress, Strain, Forces
CWELD → PWELD	Weld Element  	Analysis: Statics, Eigenvalues, Dynamics Properties: Stiffness, Damping, Consistent or Lumped Mass Material: Isotropic Loads: None Responses: None
CROD → PROD → MAT1 MAT4 DEFORM QVOL	Rod Element  	Analysis: Statics, Eigenvalues, Dynamics, Heat Properties: Stiffness, Conductivity, Damping, Consistent or Lumped Mass Material: Isotropic Loads: Gravity, Centrifugal, Temperature, Deform, Qvol Responses: Forces, Stress

<table>
<tr>
<td>CBAR → PBAR → MAT1
PBARL → MAT4
↑
PLOAD1
PLOADA
DEFORM
QVOL</td>
<td>Bar Element
 
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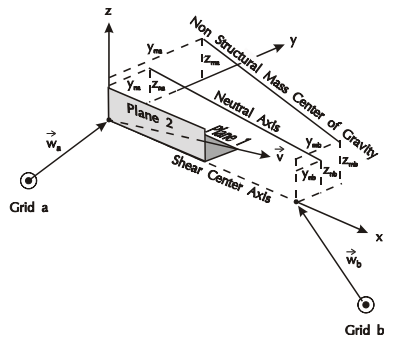
<td>Analysis: Statics, Eigenvalues, Dynamics, Heat
Properties: Stiffness, Conductivity, Damping, Consistent or Lumped Mass
Material: Isotropic
Loads: Pressure, Gravity, Centrifugal, Temperature, Deform, Qvol
Responses: Forces, Stress</td>
</tr>
<tr>
<td>CBEAM → PBEAM → MAT1
PBEAML → MAT4
↑
PLOAD1
PLOADA
DEFORM
QVOL</td>
<td>Beam Element
 
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<td>Analysis: Statics, Eigenvalues, Dynamics, Heat
Properties: Stiffness, Conductivity, Damping, Consistent or Lumped Mass
Material: Isotropic
Loads: Pressure, Gravity, Centrifugal, Temperature, Deform, Qvol</td>
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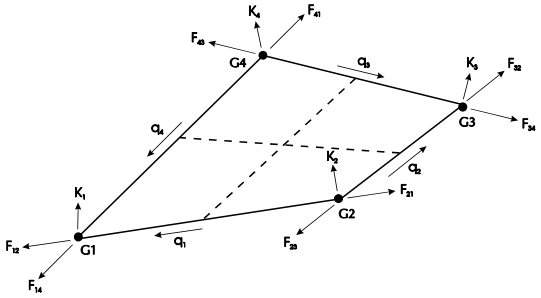
<td>CSHEAR → PSHEAR → MAT1
↑
PLOAD2
PLOAD4
PLOAD5</td>
<td>Shear Panel
 
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<td>Analysis: Statics, Eigenvalues, Dynamics
Properties: Stiffness, Damping, Consistent or Lumped Mass
Material: Isotropic
Loads: Pressure (PLOAD2, PLOAD5), Gravity, Centrifugal, Temperature
Responses: Forces, Stress</td>
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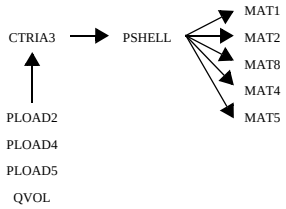
<td> 
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 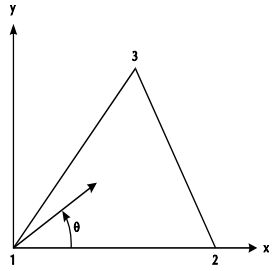
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<td rowspan="2">Analysis: Statics, Eigenvalues, Dynamics, Heat transfer
Properties: Stiffness, Conductivity, Damping, Consistent or Lumped Mass
Material: Isotropic, Orthotropic, Anisotropic
Loads: Pressure, Gravity, Centrifugal, Temperature, Qvol
Responses: Forces, Stress, Strains</td>
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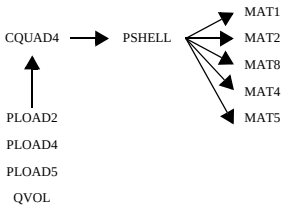
<td> 
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 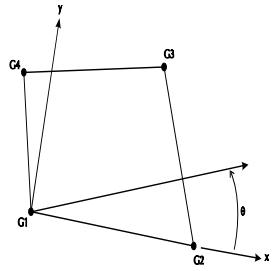
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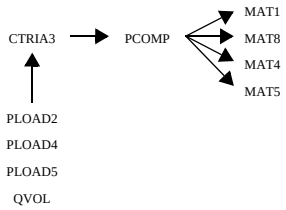
<td> 
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 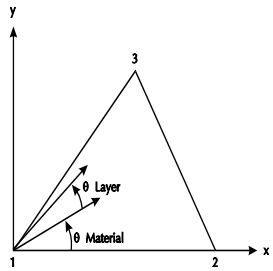
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<td rowspan="2">Analysis: Statics, Eigenvalues, Dynamics, Heat transfer
Properties: Stiffness, Conductivity, Damping, Consistent or Lumped Mass
Material: Isotropic, Orthotropic
Loads: Pressure, Gravity, Centrifugal, Temperature, Qvol
Responses: Ply failure index</td>
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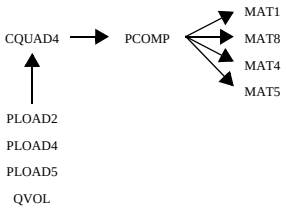
<td> 
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 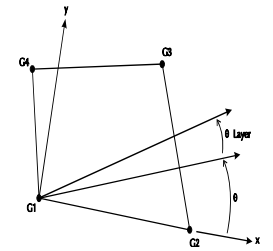
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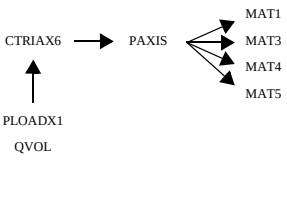
<td> 
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 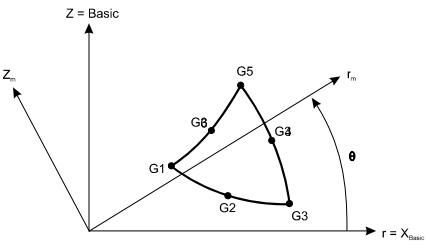
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<td>Analysis: Statics, Eigenvalues, Dynamics, Heat
Properties: Stiffness, Conductivity, Damping, Consistent or Lumped Mass
Material: Isotropic, Anisotropic
Loads: Pressure, Gravity, Centrifugal, Temperature, Qvol
Response Stress, Strains</td>
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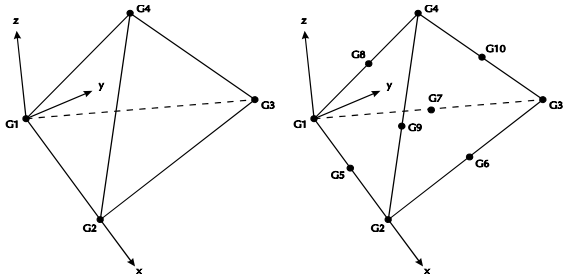
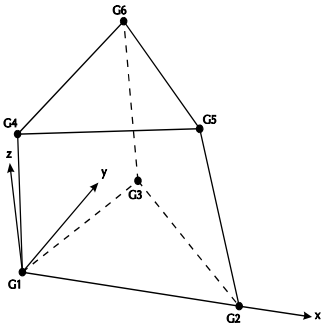
CTETRA → PSOLID → MAT1, MAT9, MAT4, MAT5
PLOAD4
QVOL

Tetrahedral Element



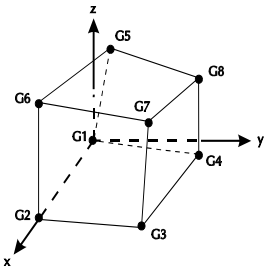
CPENTA → PSOLID → MAT1, MAT9, MAT4, MAT5
PLOAD4
QVOL

Pentahedral Element



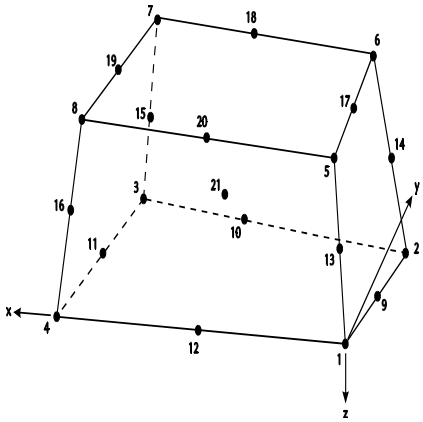
CHEXA → PSOLID → MAT1, MAT9, MAT4, MAT5
PLOAD4
QVOL

Hexahedral Element (8 nodes)

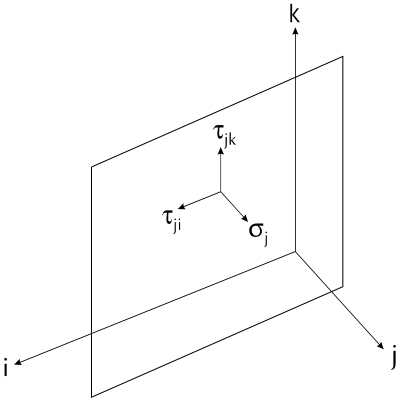


CHEXA
CHEX20 → PSOLID → MAT1, MAT9, MAT4, MAT5
PLOAD4
QVOL

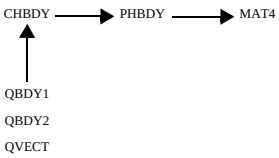
Hex20 Element (9 to 21 nodes)



Analysis:	Statics, Eigenvalues, Dynamics, Heat
Properties:	Stiffness, Conductivity, Damping, Consistent or Lumped Mass
Material:	Isotropic, Anisotropic
Loads:	Pressure, Gravity, Centrifugal, Temperature, Qvol
Responses:	Stress, Strains

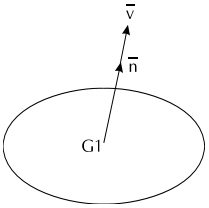


Stress - Strain Convention

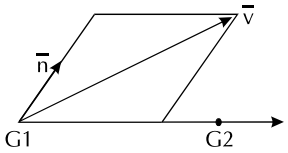


Heat Boundary Element

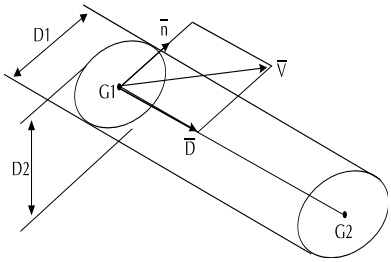
POINT



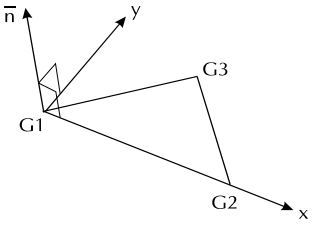
LINE



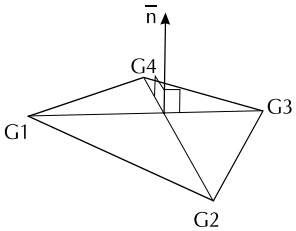
CYLINDER



AREA3



AREA4



Analysis: Heat transfer

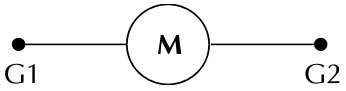
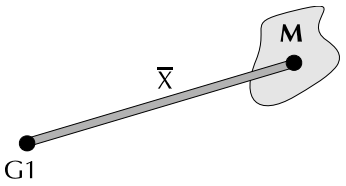
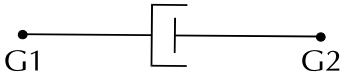
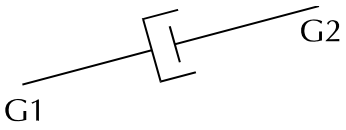
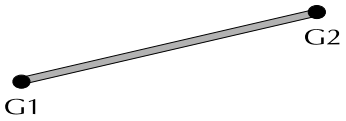
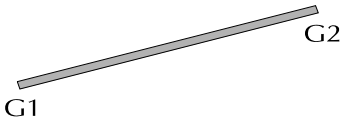
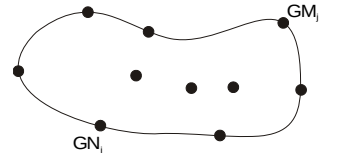
Properties: Conductivity

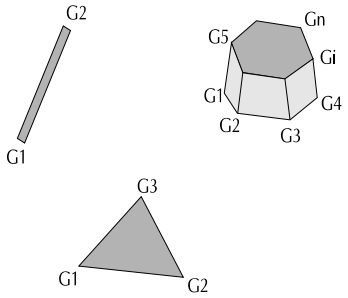
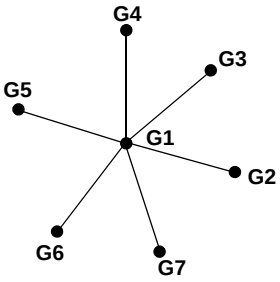
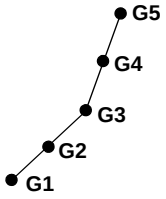
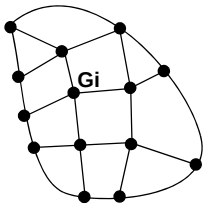
Material: Isotropic

Loads: Heat flux, Thermal vector flux

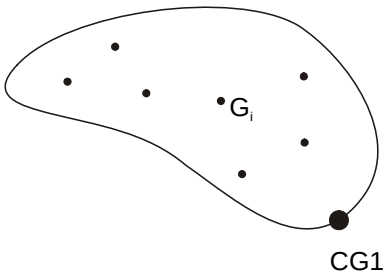
Responses: None

SPECIAL ELEMENTS

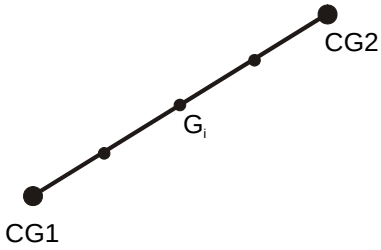
CMASS1 → PMASS CMASS2	Scalar Mass 	Analysis: Eigenvalues, Dynamics Properties: Consistent Mass Loads: Gravity, Centrifugal Responses: None
CONM2 CONM3 → PCONM3	Concentrated Mass Element 	
CDAMP1 → PDAMP CDAMP2	Scalar Viscous Damper 	Analysis: Dynamics Properties: Viscous damping Loads: None Responses: Forces
CVISC → PVISC	Viscous Damper 	
RROD	Rigid Rod 	Analysis: Statics, Eigenvalues, Dynamics Properties: High stiffness Loads: None Responses None
RBAR	Rigid Bar 	
RBE1	Rigid Body Element 	

RBE2	Rigid Body Element 	Analysis: Statics, Eigenvalues, Dynamics Properties: High stiffness Loads: None Responses None
RBE3	Interpolation Element 	Analysis: Statics, Eigenvalues, Dynamics Properties: Distributes Loads and Masses Loads: None Responses: None
RSPLINE	Spline 	Analysis: Statics, Eigenvalues, Dynamics Properties: Interpolates Displacements Loads: None Responses: None
GENEL	General Element  **K or S**	Analysis: Statics, Eigenvalues, Dynamics Properties: Stiffness and Flexibility Loads: None Responses: None

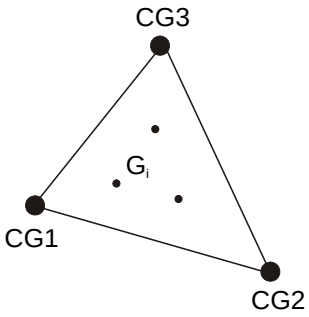
DOMAIN ELEMENTS



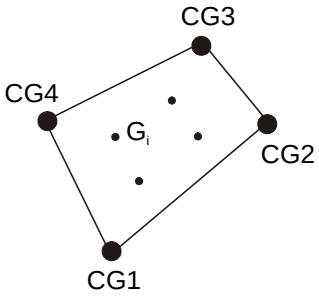
DOMAIN RBE2



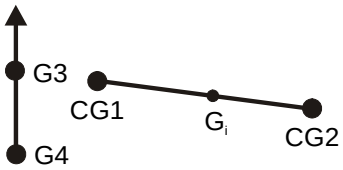
DOMAIN BAR



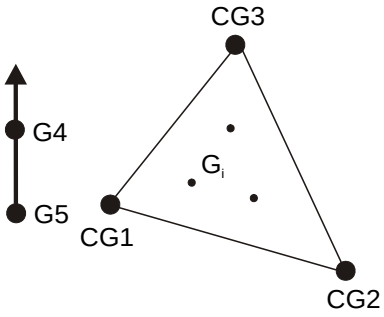
DOMAIN TRIA3



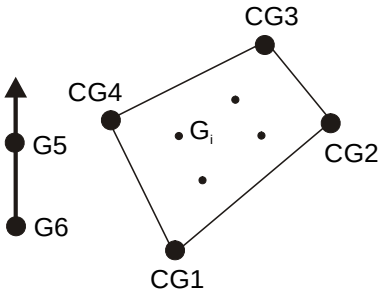
DOMAIN QUAD4



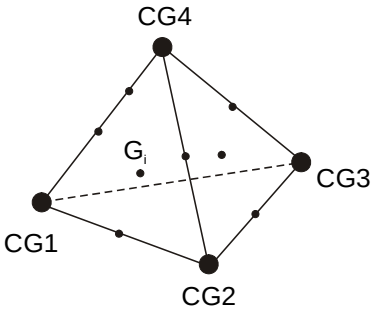
DOMAIN BARX



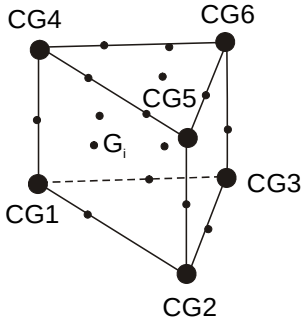
DOMAIN TRIAX3



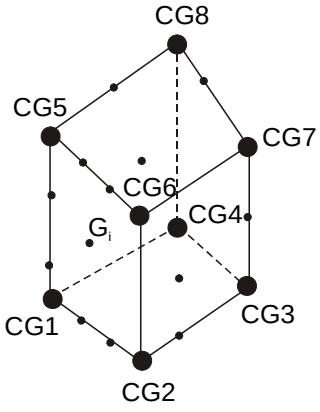
DOMAIN QUADX4



DOMAIN TETRA



DOMAIN PENTA



DOMAIN HEXA