

Manuel d'Utilisation
U4.0- booklet: Use of the orders
Document: U4.01.02

Innovations and modifications in the orders

Summary:

The object of this document is to give a comprehensive view of the modifications of syntax and new opportunities of the orders of *Code_Aster* between two stabilized versions. This update thus mentions changes introduced since **version 6.3** from April 2002 and valid for **version 6.4** from November 2002.

For more precise details, one will consult the documentation of the orders and the file `histor` under - corresponding version (e.g.: [6.3.12], section *Development* site `www.code-aster.org`). The impacted orders are listed alphabetically.

1 Innovations between versions 6.3 and 6.4

1.1 New orders

1.1.1 GENE_MATR_ALEA

This order makes it possible to produce positive definite symmetrical matrices random starting from an average matrix and of a level of uncertainty. Three laws of probability are available (cf [6.3.12]).

1.1.2 GENE_VARI_ALEA

Even object that the preceding order for real variables (cf [6.3.12]).

1.1.3 LIRE_TABLE

This new order makes it possible to read again a table which was printed by IMPR_TABLE (cf [6.3.13]).

1.1.4 MACR_LIGN_COUPE

This macro facilitates the postprocessing of mechanical results and thermics by recording the values of a field to the nodes on a line of cut (grid of segments) (cf [6.3.14]).

1.1.5 MACR_RECAL

This macro makes it possible to carry out retiming in *Code_Aster* : the macro one determines the parameters of a calculation which describe as well as possible the tests (cf [6.3.18]).

1.2 Modified orders

1.2.1 AFFE_CHAR_MECA

LIAISON_UNIL_NO removed:

- The features are henceforth available under the keyword CONTACT, except for the friction of TRESKA which is not available any more (cf [6.3.17]).

REAC_GEOM new, REAC_GEOM_INTE removed:

- The keyword REAC_GEOM allows to control the geometrical reactualization of the algorithm of contact, it is worth WITHOUT, AUTOMATIC or CONTROL. In this last case, it is necessary to specify the number of reactualizations imposed NB_REAC_GEOM (cf [6.3.10]).

STOP_SINGULIER new:

- This gives the opportunity of continuing the resolution even if a singular matrix is detected (validity of the solution being conditioned with the checking of balance) (cf [6.3.16]).

PROJECTION=' QUADRATIQUE ' new:

- When the elements in contact are quadratic, this projection makes it possible to calculate exactly the game (cf [6.3.12]).

DIRE_APPA new:

- For the method continues, the user thus imposes the direction of research of pairing (cf [6.3.14]).

INTEGRATION= ('SIMPSON' , 'SIMPSON1' , 'SIMPSON2') new possible values:

- For the method continues, this allows to specify the desired type of integration (cf [6.3.14]).

1.2.2 AFFE_MODELE

Modelings 2D_CONTACT, 3D_CONTACT removed:

- These modelings were applied to the elements of contact which were reabsorbed (see too AFFE_CHAR_MECA, cf [6.3.17]).

Modelings CONT_DVP_2D, CONT_DVP_3D removed:

- The user is not constrained any more to affect modelings relating to the algorithm of contact only it chose, the code does it itself (These modelings are relating to the continuous method).

Modelings 3D_THVD, AXIS_THVD, D_PLAN_THVD news:

- New thermohydraulic modelings (without mechanics) for the studies of storage (cf. STAT_NON_LINE and [6.3.15]).

Modelings *_HMD, *_HHHD, *_THHD, *_THMD, *_THMD news:

- New diagonal modelings THM (cf [6.3.15]).

1.2.3 CALC_ELEM

VARI_ELNO_COQU new option:

- The option VARI_ELNO_COQU calculate the internal variables in a layer of elements of HULL, GRID or DKT (keyword NIVE_COUCHE) starting from the internal variables calculated during a nonlinear calculation (cf [6.3.2]).

VALE_NCOU_MAXI new option, keywords NOM_CHAM and NOM_CMP associated:

- This option makes it possible to extract the extreme values from the component of a field defined on elements pipes like their localization (cf [6.3.19]).

CRIT_ELNO_RUPT new option:

- This option calculates 6 criteria of rupture in orthotropic materials (cf [6.3.7]).

ETOT_ELGA, ETOT_ELNO_ELGA, ETOT_ELEM new options:

- These options calculate the density of total energy at the points of integration (ETOT_ELGA), with the nodes (ETOT_ELNO_ELGA) and density of total energy integrated on the elements (ETOT_ELEM) (cf [6.3.17]).

TEMP_INIT removed:

- This keyword was not used (cf [6.3.3]).

1.2.4 CALC_FATIGUE

TYPE_CALCUL new:

- Allows to choose the type of fatigue analysis asked, is worth CUMUL_DOMMAGE or FATIGUE_MULTI.

Keywords RESULT, CHAM_MATER, CRITERION, METHOD new:

- To determine the plan in which shearing is maximum in axial fatigue analysis multi - (FATIGUE_MULTI, cf [6.3.9]).

1.2.5 CALC_FONCTION

POWER new:

- Allows to calculate the nth power of a function (cf [6.3.12]).

NORMALIZES new:

- Calculate the L2 standard of a function (cf [6.3.12]).

CORR_ACCE new:

- Allows to correct a real accélérogramme (cf [6.3.2]).

LISS_ENVELOP new:

- Calculate the spectrum envelope smoothed starting from a rough spectrum (cf [6.3.16]).

1.2.6 CALC_G_THETA_T**FOND_FISS new:**

- In the past BOTTOM to homogenize the vocabulary with the other orders CALC_G_* (cf [6.3.10]).

1.2.7 CALC_META**ETAT_INIT/INST_INIT new:**

- During a recovery, this keyword makes it possible to define the moment from which calculation will be continued (cf [6.3.19]).

1.2.8 CALC_THETA**FOND_FISS new:**

- Idem CALC_G_THETA_T.

1.2.9 COMB_MATR_ASSE**CALC_AMOR_GENE new:**

- This built an object MATR_ASSE_GENE corresponding to the matrix of damping of BASILE starting from a list of reduced depreciation (cf [6.3.19]).

1.2.10 COMB_SISM_MODAL**COMB_DEPL_APPUI new:**

- This keyword makes it possible to calculate the answers of the primary education loadings (seismic excitation) and secondaries (due to differential displacements of anchoring). It is necessary to define NUME_CAS under DEPL_MULT_APPUI (cf [6.3.8]).

1.2.11 BEGINNING**CODE/NIV_PUB_WEB new:**

- Under the keyword CODE (for the CAS-tests), NIV_PUB_WEB the level of diffusion of the test defines on the Web site of *Code_Aster* (cf [6.3.6]).

1.2.12 DEFI_MATERIAU**TEMP_DEF_ALPHA obligatory:**

- The presence of this keyword is from now on obligatory if the dilation coefficient ALPHA depends on the temperature (cf [6.3.3]).

Withdrawn laws of behavior:

- The following laws of behavior were withdrawn from the code because of their lack of qualification (cf [6.3.25]): OHNO, VISCOCHAB, VENDOCHAB, LMARC, NADAI_B, SURF_ETAT_SATU, SURF_ETAT_NSAT, CAM_CLAY_THM, LIQU_SATU_GAT, LIQU_NSAT_GAT.

EFFO_N_INIT modified:

- This parameter, used with the discrete elements, can now depend on the temperature (cf [6.3.19]).

BAZANT_FD new:

- Model of creep of dessication of Bazant (creep due to the drying of the concrete under mechanical loading) (cf [6.3.13]).

MAZARS_FO new:

- Model of Mazars allowing to take into account the variation of the coefficients compared to the temperature (cf [6.3.18]).

1.2.13 DYNA_NON_LINE and STAT_NON_LINE

See DEFI_MATERIAU for the laws of behaviors removed and added.

KIT_THV new:

- New relation, without mechanics, for the studies of storage. The ddl are the water temperature and pressure; the steam pressure being an internal variable (cf [6.3.15]).

1.2.14 EXTR_RESU

SENSITIVITY new:

- This makes it possible to exploit the sizes derived during the extraction from a result (cf [6.3.1]).

1.2.15 IMPR_TABLE

FORMAT=' ASTER ' new:

- This keyword makes it possible to print a table with the format Aster, to see too LIRE_TABLE (cf [6.3.13]).

1.2.16 LIRE_MAILLAGE

VERI_MAIL by default:

- By default, the checking of the grid is activated (orphan nodes, double meshes, flattened meshes...) (cf [6.3.3]).

1.2.17 LIRE_MISS_3D

NAME new:

- This makes it possible to define the name of the file in reading (cf [6.3.12]).

1.2.18 LIRE_RESU

MATR_A, MATR_B new:

- One provides behind these keywords the matrices of rigidity and mass to be able to read again (and test) a mode obtained by DYNA_TRAN_MODAL (cf [6.3.19]).

FORMAT=' MED ' new:

- This makes it possible to read again results with format MED (recommended for the exchanges between computer codes EDF/CEA). For the moment, only the fields with the nodes are treated (cf [6.3.2]).

Keywords simple associates: NOM_MED, NOM_CMP, NOM_CMP_MED,
NOM_CMP_IDEM, NOM_MAIL_MED, UNIT.

DATASET_58 new:

- This format makes it possible to read again the abundant data by software of experimental measurement (cf [6.3.8]).

1.2.19 MACR_ADAP_MAIL and MACR_INFO_CALC

VERSION_HOMARD new value by default:

- The version by default of LOBSTER is now v5_5.

1.2.20 MACR_ASCOUF_CALC and MACR_ASPIE_CALC

PRESS_LEVRE new:

- This keyword makes it possible to apply or not the pressure interns on the lips of a crack emerging in internal skin (cf [6.3.19]).

1.2.21 MECA_STATIQUE

SIEF_ELGA_DEPL by default:

- This option is henceforth calculated by default. One can specify `OPTION=' SANS '` if it is not wished (cf [6.3.19]).

1.2.22 MODI_MALLAGE

MODI_BASE new:

- Allows to impose a change of reference mark (cf [6.3.18]).

TRANSLATION, ROTATION, SCALE new:

- These keywords make it possible to operate translations, rotations and put at scale of a grid (cf [6.3.18]).

1.2.23 POST_K1_K2_K3

FOND_FISS new:

- See `CALC_G_THETA_T`.

TOUT_ORDRE, NUME_ORDRE, LIST_ORDRE new:

- The setting in data is modified, the order itself will explore the structure of data result (cf [6.3.4]).

1.2.24 POST_RCCM

OPTION=' FATIGUE_B3200 ' new:

- Analysis with the tiredness of a line of healthy piping according to code RCCM §B3200 (cf [6.3.19]).

OPTION=' FATIGUE_B3600 ' new:

- Analysis with the tiredness of a line of healthy piping according to code RCCM §B3600 (cf [6.3.16]).

1.2.25 PRE_GMSH

MODI_QUAD new:

- Product of the quadratic meshes before converting the grid GMSH with the format ASTER (cf [6.3.7]).

1.2.26 PROJ_MESU_MODAL

Syntax was deeply altered and its wide possibilities.

- See the documentation of the order and the CAS-tests `sdl104` and `sdlv122` (cf [6.3.18]).

2 Innovations between versions 6.2 and 6.3

2.1 Modifications common to several orders

TAILLE_BLOC removed:

- Functionality taken again by BEGINNING and CONTINUATION, TAILLE_BLOC is not available any more in the following orders:

| | | |
|------------------|------------------|------------------|
| AFFE_CHAR_ACOU | AFFE_CHAR_MECA | AFFE_CHAR_MECA_C |
| AFFE_CHAR_MECA_F | AFFE_CHAR_OPS011 | AFFE_CHAR_THER |
| AFFE_CHAR_THER_F | AFFE_MODELE | CALC_CHAM_ELEM |
| CALC_ELEM | CALC_FORC_AJOU | CALC_MATR_AJOU |
| CALC_NO | DYNA_NON_LINE | MACR_ASCOUF_CALC |
| MACR_ASPIC_CALC | MACR_ELEM_STAT | MACRO_ELAS_MULT |
| MACRO_MATR_AJOU | MACRO_MATR_ASSE | MACRO_PROJ_BASE |
| MECA_STATIQUE | NUME_DDL | NUME_DLL_GENE |
| POST_ELEM | RECA_WEIBULL | STAT_NON_LINE |
| THER_LINEAIRE | THER_NON_LINE | THER_NON_LINE_MO |

2.2 Reabsorbed order

MACRO_CHAR_F_U is removed. The functionality is covered by piloting specific to the limiting analysis ANA_LIM of STAT_NON_LINE (cf [6.2.17]).

2.3 Changes of convention

- **ANGL_REP** under the keyword factor HULL in AFPE_CARA_ELEM : change of sign of the angle β (see AFPE_CARA_ELEM) (cf [6.2.14]),
- **NU_LT** becomes **NU_TL** and reciprocally (see DEFI_MATERIAU) in ELAS_ORTH,
- Coefficient $\frac{1}{2}$ in the calculation of the thermal contribution of **ENER_POT** (see CALC_ELEM and POST_ELEM, cf [6.2.13]).

2.4 Modified orders

2.4.1 AFPE_CARA_ELEM

AFPE_SECT, AFPE_FIBRE new:

- To allow to describe the section of a multifibre element of beam starting from a grid 2D (keyword factor AFPE_SECT) or directly by defining fibres in one (keyword AFPE_FIBRE, cf [6.2.6]).

HULL/ANGL_REP modified:

- Convention used here was contrary with those taken for the beams and the definition of the reference marks of orthotropy. The sign of the second angle defined by ANGL_REP is thus reversed, it is the convention of the nautical angles (cf [6.2.14]).

COQUE_NCOU , GRILLE_NCOU , TUYAU_NSEC and TUYAU_NCOU new:

- Under the keywords factors HULL, GRID, and BEAM to describe the cutting of a hull/plate in layers, of a pipe in layers and angular sectors. They were previously indicated under STAT_NON_LINE (cf [6.2.6]).

DIST_N removed:

- Replaced by OFFSETTING (cf [6.2.30]).

2.4.2 AFFE_CHAR_MECA

HARLEQUIN/CARA_ELEM new:

- To provide the characteristics of the hull in the case of a junction enters a model 3D and a model hull (cf [6.2.28]).

GONE new:

- Allows to impose the incompressibility on the new incompressible elements (cf [6.2.17]).

2.4.3 AFFE_MODELE

AFFE/PHENOMENON and AFFE/MODELING new possibilities:

- Suppression of the phenomenon NON_LOCAL, and addition in the phenomenon MECHANICS nonlocal laws of behavior regularized on the deformation, and of associated modelings: 3D_GRAD_EPSI, D_PLAN_GRAD_EPSI, C_PLAN_GRAD_EPSI, AXIS_GRAD_EPSI and of modelings associated with the formulation with gradients with internal variables 3D_GRAD_VARI, D_PLAN_GRAD_VARI, C_PLAN_GRAD_VARI, AXIS_GRAD_VARI (cf [6.2.20]).
- New modeling PLAN_FISSURE associated with the finite elements of type CZM (joined) allowing to treat the propagation of crack with a law of behavior of the type Barenblatt (cf [6.2.26]).
- New modelings 3D_INCO, D_PLAN_INCO (replaces PLAN_INCO), C_PLAN_INCO associated with the formulation with three fields of the new incompressible element (displacement, pressure, swelling, cf [6.2.17]).
- New modelings lumpées in THM: 3D_HHMD, 3D_HMD, 3D_THHD, 3D_THHMD, 3D_THMD, AXIS_HHMD, AXIS_HMD, AXIS_THHD, AXIS_THHMD, AXIS_THMD, D_PLAN_HHMD, D_PLAN_HMD, D_PLAN_THHD, D_PLAN_THHMD, D_PLAN_THMD (points of integration brought back to the tops of the elements, cf [6.2.25]).
- New modelings POU_D_EM (right beam of Euler) and POU_D_TGM (right beam of Timoshenko with warping) associated with the multifibre beams (cf [6.2.6]).

AFFE/MODELING change of name:

- Modeling PIPE is not accessible any more, it is replaced by TUYAU_3M (cf [6.2.30]).

2.4.4 ASSISTANCE

ORDER removed:

- This functionality is not available any more (did not function any more since version 6.0).

2.4.5 CALC_ELEM

EPOT_ELEM_DEPL modified:

- Homogenisation of the calculation of the potential energy (suppression of the $\frac{1}{2}$ for the thermal contribution at the end of the deformation energy) and addition of the thermal term of dilation for the elements of structure (cf [6.2.22]).

SENSITIVITY/ THETA removed:

- SENSITIVITY is now a simple keyword which receives the list of the significant parameters, THETA is replaced by PARM_THETA (cf [6.2.1]).

PARM_THETA new:

- Point out the value of the parameter of theta method used to solve transitory thermal calculation, value by default: 0.57.

ERTH_ELEM_TEMP and ERTH_ELNO_ELEM new:

- Options associated with the estimator with error in residue in thermics (cf [6.2.1]).

INFORMATION new:

- Allows to obtain details on calculations carried out (in particular of sensitivity, cf [6.2.1]).

DLSI_ELGA_DEPL removed:

- This option is removed. The calculation of the Lagrangian derivative from now on is activated by the operator of calculation (MECA_STATIQUE, STAT_NON_LINE, THER_LINEAIRE) when the keyword SENSITIVITY is activated.

2.4.6 CALC_MATR_ELEM

MASS_ID_MDEP_R, MASS_ID_MTEM_R, MASS_ID_MDNS_R, MASS_ID_MTNS_R new:

- Options allowing to calculate a matrix identity (displacements or temperatures, symmetrical or not-symmetrical) on finite elements in order to calculate the eigenvalues of a matrix of rigidity or other (cf [6.2.9]).

2.4.7 CALC_NO

SENSITIVITY new:

- List of the significant parameters (cf [6.2.1]).

DLDE_NOEU, DLSI_NOEU_DLDE, DLTE_NOEU removed:

- The calculation of these options is not available any more. The calculation of the Lagrangian derivative from now on is provided by the operator of calculation (MECA_STATIQUE, STAT_NON_LINE, THER_LINEAIRE) when the keyword SENSITIVITY is activated.

2.4.8 COMB_SISM_MODAL

TYPE_COMBI replacement:

- This keyword replaces TYPE who was removed in version 6.4, possible values: QUAD, LINE, ABS (cf [6.2.26]).

2.4.9 CREA_RESU

OPERATION new:

- Defines the operation to carry out among AFFE, ECLA_PG, PERM_CHAM, PROL_RTZ (cf [6.2.12]).

NUME_ORDRE_INIT removed:

PRECISION, CRITERION new:

- The user does not provide any more a sequence number, the access is done directly starting from the value of the moment by possibly providing one PRECISION and one CRITERION (cf [6.2.21]).

2.4.10DEFI_BASE_MODAL

DIAG_MASS new:

- This option makes it possible to create a modal base containing the static modes and the dynamic modes, the static modes are such as the matrix of mass projected on this basis is diagonal (cf [6.2.11]).

2.4.11DEFI_FONC_ELEC

INST_CC_INIT obligatory:

- This keyword is now obligatory (cf [6.2.14]).

2.4.12DEFI_GROUP

CRIT_NOEUD new:

- Allows to define starting from a group of mesh, a group of nodes only made up of the nodes TOPS, of the nodes MEDIUMX, or of the nodes CENTER (cf [6.2.17]).

2.4.13DEFI_MATERIAU

NU_LT modified:

- In ELAS_ORTH, one takes the convention of Batoz, that is to say: NU_LT/E_L = NU_TL/E_T, as in DEFI_COQU_MULT (cf [6.2.13]).

ROUSS_VISC new:

- Model of Rousselier extended to viscoplasticity, parameters SIGM_0, EPSI_0 and M (cf [6.2.10]).

FLU_IRRA new:

- Modification of the law ASSE_COMBU to take into account a dependence of creep compared to the fluence. Keywords: QSR_K, BETA, PHI_ZERO and L (cf [6.2.9] and [6.2.13]).

LABORD_1D new:

- New law of behavior 1D endommageable for the concrete (cf [6.2.6]).

MAZARS new:

- New law of behavior endommageable for the concrete (cf [6.2.25]).

CAM_CLAY new:

- New law of elastoplastic behavior for the porous environments (grounds, porous joints, cf [6.2.25]).

LAIGLE new:

- New law of behavior in rock mechanics (cf [6.2.25]).

RUPT_FRAG modification:

- New keywords SIGM_C and SAUT_C to treat the propagation of crack with the elements CZM (cf [6.2.26]).

NORTON_HOFF removed:

- The new incompressible finite elements offer the same functionality by using only the elastic limit (cf [6.2.17]).

2.4.14DYNA_LINE_HARM

SENSITIVITY new:

- List of the significant parameters (cf [6.2.1]).

2.4.15 DYNA_NON_LINE and STAT_NON_LINE

ENDO_ISOT_BETON new:

- Replace the behaviors `BETON_ENDO_LOCAL` and `BETON_GRAD_EPSI` who are removed (cf [6.2.25]).

ENDO_FRAGILE new:

- Replace the behavior `ENDO_LOCAL` and `ENDO_GRAD_EPSI` (cf [6.2.25]).

PLAS_GRAD_LINE , PLAS_GRAD_TRAC removed:

- The laws specific to the nonlocal behavior are removed, one uses in this case respectively `VMIS_ISOT_LINE` and `VMIS_ISOT_TRAC`. Associated with a modeling `*_GRAD_EPSI` or `*_GRAD_VARI` in `AFFE_MODELE` (cf [6.2.22]).

LABORD_1D , MAZARS , BARENBLATT , ROUSS_VISC , CAM_CLAY , LAIGLE new:

- New behaviors (see `DEFI_MATERIAU`).

SENSITIVITY new:

- List of the significant parameters (cf [6.2.1]).

INCREMENT/OPTI_LIST_INST , NOM_CHAM , NOM_CMP , VALE new:

- Under the keyword factor `INCREMENT`, these new keywords define the options of the automatic recutting of the step of time (cf [6.2.21]).

RHO replaced:

- The coefficient of penalization of Lagrangian increased is henceforth provided under the keyword `R` (cf [6.2.22]).

MODELE_NON_LOCAL removed:

- This keyword does not exist any more, the nonlocal behavior is activated directly starting from the choice of the elements in `AFFE_MODELE` (cf [6.2.22]).

TUYAU_NCOU , TUYAU_NSEC , COQUE_NCOU removed:

- These characteristics are henceforth indicated in `AFFE_CARA_ELEM` (cf [6.2.6]).

HYDR removed:

- To use the behavior `HYDR`, it is necessary to overload the code in development mode with the routines `PERMEA` and `SATURATED` or to use `HYDR_UTIL` with the definition of the parameters materials in `DEFI_MATERIAU` (cf [6.2.19]).

2.4.16EXTR_RESU

NOM_CHAMP new:

- To oppose to `CHAMP_EXCLU`, the user can select is the fields which it wishes to preserve, that is to say those that it wishes to exclude (cf [6.2.14]).

2.4.17IMPR_COURBE

EXCEL new:

- To print one or more curves in columns (cf [6.2.4]).

2.4.18IMPR_FICO_HOMA

NUMORD_INDICA , NUMPT_INDICA , NOM_RESU_INDICA , NOM_CHAM_INDICA new:

- Information on the indicator of error: sequence number, not time and name of the field of the indicator in the structure of data result (cf [6.2.16] and [6.2.22]).

NOM_MED_SUPPOR removed:

- One uses from now on name MED of the grid as starter.

2.4.19IMPR_MACR_ELEM

FORMAT 'PLEXUS' new:

- Allows to print with format IDEAS version 5: matrices of mass and rigidity generalized per block, clean modes dynamic, static modes of the modal base (cf [6.2.11]).

2.4.20IMPR_RESU

FORMAT 'GMSH' new:

- Impression for postprocessing with format GMSH (cf [6.2.17]).

2.4.21LIRE_CHAMP

NUME_ORDRE , NUME_PT , NOM_MAIL_MED new:

- Information for the reading of a field to format MED (cf [6.2.16] and [6.2.22]).

2.4.22MACR_ASCOUF_CALC

TRANSFORM new:

- Allows to determine the local reference mark of postprocessing (cf [6.2.24]).

2.4.23MACR_ASCOUF_MAIL

SYME new:

- The allowed values are from now on: QUARTER, HALF, ENTIRETY (cf [6.2.24]).

LENGTH new:

- Parameter used in the case of axisymetry (cf [6.2.24]).

2.4.24MACR_ASPIG_CALC

RCCM new:

- Activate the post treatments according to the rules of dimensioning of the RCCM.

COMP_INCR new:

- Keyword gathering factor RELATION and VMIS_ISOT_TRAC.

2.4.25MACRO_MODE_MECA

COEF_DIM_ESPACE new:

- See `MODE_ITER_SIMULT`.

2.4.26 MECA_STATIQUE

SENSITIVITY/ THETA removed:

- SENSITIVITY is now a simple keyword which receives the list of the significant parameters, THETA is removed (cf [6.2.1]).

2.4.27 MODE_ITER_SIMULT

COEF_DIM_ESPACE new:

- Multiplicative coefficient which makes it possible to modulate the waveband for each under - space (cf [6.2.14]).

2.4.28 MODI_MAILLAGE

GROUP_NO_APPUI , GROUP_NO_STRU new:

- Groups of nodes of the support and the structure for the reactualization of the supports (cf [6.2.17]).

2.4.29 MODI_OBSTACLE

BORING new:

- To transmit a message of alarm during the boring of the tube (cf [6.2.13]).

2.4.30 NUME_DDL

MODEL , LOAD new:

- To obtain information on classification in order to appreciate the size of a model without doing the calculation (cf [6.2.14]).

2.4.31 POST_ELEM

ENER_POT modified:

- See EPOT_ELEM_DEPL of CALC_ELEM (cf [6.2.22]).

TRAV_EXT new:

- Keyword factor to calculate the work of the external efforts (cf [6.2.20]).

2.4.32 POST_FATIGUE

LOADING new:

- Keyword factor for better structuring the order (possible values: UNIAXIAL, PERIODIC, UNSPECIFIED, cf [6.2.13]).

2.4.33 POST_K_BETA

- **New order** for the analysis of harmfulness of defect by the K_beta method; intended for the tool trade Secure-Epicure (cf [6.2.28]).

2.4.34 POST_RCCM

GRID , NODE , GROUP_NO new:

- Allows to define a way starting from a group or of a list of nodes (cf [6.2.5]).

2.4.35 POST_RELEVE_T

OPERATION= ' MOYENNE_RCCM' removed:

- From now on, this operation is carried out only by POST_RCCM, should be provided working stress SM in DEFI_MATERIAU (cf [6.2.25]).

NOEUD_CMP new:

- New variable of access (cf [6.2.3]).

2.4.36 PROJ_CHAMP

TOUT_CHAM, NOM_CHAM new:

- Choice of the fields to be projected (cf [6.2.25]).

2.4.37 PROJ_MATR_BASE

NB_VECT removed:

- Information is provided in NUME_DDL_GENE (cf [6.2.20]).

2.4.38 PROJ_MESU_MODAL

MEASUREMENT/MODEL new:

- Name of the model of measurement (cf [6.2.11]).

2.4.39 PROJ_VECT_BASE

NB_VECT removed:

- See PROJ_MATR_BASE.

2.4.40 RECU_FONCTION

SOUS_POINT new:

- To recover the value on a under-point (used for the multi-layer elements and the multifibre beams, cf [6.2.6]).

2.4.41 RECU_TABLE

NOM_PARA new:

- To recover the value of a parameter (cf [6.2.11]).

2.4.42 STAT_NON_LINE

See DYNA_NON_LINE .

2.4.43 TEST_RESU

SOUS_POINT new:

- Allows to specify the under-point on which one wants to test the value (cf [6.2.6]).

2.4.44 THER_LINEAIRE

SENS_INIT new:

- Defines the initial field of a transitory calculation from which the evolutionary calculation of the derivative of the temperature is carried out; replace DEUL_INIT.

2.4.45THER_NON_LINEAIRE

SENSITIVITY new:

- To provide the list of the significant parameters (cf [6.2.9]).