SDLX201 - Test of not-regression: clean modes

Summary:

It is about a test of not-regression to validate:

- Various modal solveurs in GEP and QEP with symmetrical real;
- Their interworking with the direct linear solveurs;
- Certain modal orders the pre one and postprocessing (INFO_MODE, NORM_MODE,...).
1 Problem of reference

1.1 Geometry

It is about an assembly:
• of a parallelepiped length $10.\,m$, of width $3.\,m$ and of depth $1.\,m$,
• of a rectangular plate length $10.\,m$, of width $3.\,m$ and thickness $1.\,m$,
• of a beam length $10.\,m$ and of rectangular section $3.\,m \times 1.\,m$.

1.2 Material properties

• $E = 2.0 \times 10^5 \, N/m^2$
• $\nu = 0.3$
• $\rho = 8000. \, Kg/m^3$
• $\alpha = 0$.

1.3 Boundary conditions

Imposed displacements are:
• on the group ‘GRNO1’ $DX = DY = DZ = 0$
• on the nodes N10, N11, N26, N23 $DZ = 0$
2 Solution

2.1 Sizes and results of reference

The reference variables used are the number of modes by wavebands, the Eigen frequencies and the modal deformations.
3 Modeling A

3.1 Characteristics of modeling

Modeling 3D, DKT and POU_D_E:

<table>
<thead>
<tr>
<th>Many nodes</th>
<th>Many meshes</th>
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<tbody>
<tr>
<td>28</td>
<td>7</td>
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</tbody>
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That is to say:

- SEG2  2
- TRIA3  4
- HEXA20 1

3.2 Pre and modal postprocessings

A set of tests is carried out with the operator NORM_MODE according to several criteria.

3.3 Configurations of solveurs tested

Problem GEP:

- **LDLT** for CALC_MODES
  - by using the standard option ‘BAND’;
  - by using the standard option ‘PLUS_PETITE’;
  - by using the standard option ‘CENTER’;
  - by using the standard option ‘NEAR’;
  - by using the standard option ‘SEPARATE’;
  - by using the standard option ‘ADJUSTS’.

- **MULT_FRONT** for CALC_MODES
  - by using the standard option ‘BAND’;
  - by using the standard option ‘PLUS_PETITE’;
  - by using the standard option ‘CENTER’;
  - by using the standard option ‘NEAR’;
  - by using the standard option ‘SEPARATE’;
  - by using the standard option ‘ADJUSTS’.

- **MUMPS** for CALC_MODES
  - by using the standard option ‘BAND’;
  - by using the standard option ‘PLUS_PETITE’;
  - by using the standard option ‘CENTER’;
  - by using the standard option ‘NEAR’;
  - by using the standard option ‘SEPARATE’;
  - by using the standard option ‘ADJUSTS’.

Problem QEP:

- **LDLT** for CALC_MODES
  - by using the standard option ‘CENTER’;
  - by using the standard parameter setting MODE_RIGIDE=' NON';
  - by using the standard option ‘NEAR’.

- **MULT_FRONT** for CALC_MODES
  - by using the standard option ‘CENTER’;
  - by using the standard parameter setting MODE_RIGIDE=' NON';
  - by using the standard option ‘NEAR’.

- **MUMPS** for CALC_MODES
  - by using the standard option ‘CENTER’;
  - by using the standard parameter setting MODE_RIGIDE=' NON';
  - by using the standard option ‘NEAR’.
4 Modeling B

4.1 Characteristics of modeling

Modeling B is identical to the modeling A but launched in parallel.
5 Summary of the results

This CAS-test shows the good performance of the modal solveurs in the various studied cases.