

ZZZZ337 – Checking of INFO_MODE and of CALC_MODES+OPTION=' BANDE ' parallels

Summary:

This test does not validate new modeling. It is gauged to function on 1 (modeling b) and 4 processors (modeling a).

It is about a data-processing and functional test of the various levels of parallelism available in the operators INFO_MODE and CALC_MODES+OPTION=' BANDE ' with cutting in sub-bands.

The sequential version (modeling b) serves as reference.

1 Problem of reference

This test is copied on the first calculation `CALC_MODES+OPTION='BANDE'` CAS-test `fdlv112b` ($N=5229$ degrees of freedom). One seeks 50 modes into 2.3 or 4 sub-bands according to the cases. One pre-gauges, each modal research, by calls to `INFO_MODE` parallel.

This test is dedicated to the data-processing and functional validation of the parallel diagrams of calculations of `CALC_MODES+OPTION='BANDE'` with cutting in sub-bands, and of `INFO_MODE`.

One tests the validity of a good amount of possible parallel configurations while playing on:

- Levels of activated parallelism (S) (if modeling a),
- The distribution of processes MPI by sub-bands (if modeling a),
- The criterion of post-checking of Sturm (if `CALC_MODES`),
- The combinative one of the digital parameters (modal solveurs and/or direct linear solveurs).

Calculation is launched on 4 processors (if modeling a) and 1 processor (if modeling b).

Thus, calculations suggested are:

With potentially 2 levels of parallelism ¹ (NIVEAU_PARALLELISME='COMPLET'):

- if many processors < many nonempty sub-bands : case treated in the CAS-test `erreu015a`; Stop in `ERREUR_F_MODAL_10` some are the values of the other parameters.
- if many processors = many nonempty sub-bands : here 4 processors and 4 sub-bands. Parallel calculation called "4x1²". A calculation `INFO_MODE` and 3 calculations `CALC_MODES+MUMPS`, with the modal solver by default, by varying the values of the test of Sturm ('LOCAL' GLOBAL'// 'NOT'). Concepts users `nbmd41` and `mode41`, `mode411` and `mode41n`.
Idem by blending the linear solver ('MULT_FRONT'and'LDLT'), the criterion of Sturm and the modal solver ('JACOBI' and 'TRI_DIAG'). Concepts users `nbmdMF/nbmdLDLT` and `modeSM/modeLM/modeJM`.
- if many nonempty processors = alpha*nombre of sub-bands (alpha entier>1) : here 4 processors and 2 sub-bands (alpha=2).
If the direct solver is not MUMPS: case treated in the CAS-test `erreu015a`; Stop in `ERREUR_F_MODAL_9/10`. And this, some are the values of the other parameters.
If the direct solver is MUMPS: parallelism known as "2x2³". A calculation `INFO_MODE` and 3 calculations `CALC_MODES`, with the modal solver by default, by varying the values of the test of Sturm ('LOCAL' GLOBAL'// 'NOT'). Concepts users `nbmd22` and `mode22`, `mode221` and `mode22n`.
- if many processors > alpha*nombre of sub-bands not vides+1 (alpha entier>1) : here 4 processors and 3 sub-bands (alpha=1).
If the direct solver is not MUMPS: case treated in the CAS-test `erreu015a`; Stop in `ERREUR_F_MODAL_9/10`. And this, some are the values of the other parameters.
If the direct solver is MUMPS: parallelism known as "1x2 + 2 (1x1)⁴". A calculation `INFO_MODE` and 3 calculations `CALC_MODES` by varying the values of the test of Sturm ('LOCAL' GLOBAL'// 'NOT') with the modal solver by default. Concepts users `nbmd211` and `mode2111`, `mode2111` and `mode211n`.

With potentially 1 level of parallelism ⁵ (NIVEAU_PARALLELISME='PARTIEL'):

- if many processors < many nonempty sub-bands : here 4 processors and 5 sub-bands.
If the direct solver is not MUMPS: case treated in the CAS-test `erreu015a`; Stop in `ERREUR_F_MODAL_14`. And this, some are the values of the other parameters.

- 1 One on the level of the sub-bands, supplemented, if it there is enough process MPI, by a second on the level of the linear solver (if this one is `MUMPS`).
- 2 Each sub-band was seen reserving its dedicated processor.
- 3 Each sub-band was seen reserving its dedicated group of 2 processors.
- 4 The first sub-band is treated on 2 processors, then each following sub-band is treated by a different processor.
- 5 Only the second level of the linear solver (if this one is `MUMPS`).

Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.

- If the direct solver is MUMPS*: parallelism says "5 (1x4)⁶". A calculation INFO_MODE and 3 calculations CALC_MODES, with the modal solver by default, by varying the values of the test of Sturm ('LOCAL' GLOBAL'// 'NOT'). Concepts users nbmd15 and mode15, mode15l and mode15n.
- if many processors = many nonempty sub-bands: here 4 processors and 4 sub-bands.
If the direct solver is not MUMPS: case treated in the CAS-test erreu015a; Stop in ERREUR_F_MODAL_14. And this, some are the values of the other parameters.
If the direct solver is MUMPS: Calcul parallel said "4 (1x4)⁷". A calculation INFO_MODE and 3 calculations CALC_MODES+MUMPS, with the modal solver by default, by varying the values of the test of Sturm ('LOCAL' GLOBAL'// 'NOT'). Concepts users nbmd14 and mode14, mode14l and mode14n.
 - if many processors > alpha*nombre of nonempty sub-bands (alpha entier>1):
Without object.
 - if many processors > alpha*nombre of sub-bands not vides+1 (alpha entier>1): here 4 processors and 3 sub-bands (alpha=1).
If the direct solver is not MUMPS: case treated in the CAS-test erreu015a; Stop in ERREUR_F_MODAL_14. And this, some are the values of the other parameters.
If the direct solver is MUMPS: parallelism says "3 (1x4)⁸". A calculation INFO_MODE and 3 calculations CALC_MODES by varying the values of the test of Sturm ('LOCAL' GLOBAL'// 'NOT') with the modal solver by default. Concepts users nbmd13 and mode13, mode13l and mode13n.

For each calculation CALC_MODES, one tests 8 values of not-regression of mode_meca:

- 4 eigenvalues catches at the boundaries of the subintervals².
- 4 values of the unit effective modal mass taken arbitrarily, by permuting the components.

For each calculation INFO_MODE parallels, one tests 3 values of not-regression of the components 'NB_MODE' sd_table:

- the minimal value,
- the maximum value,
- the sum.

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- 6 The 5 sub-bands are treated the ones after the others (by order ascending) and, each time, one devotes 4 processors to it.
 - 7 The 4 sub-bands are treated the ones after the others (by order ascending) and, each time, one devotes 4 processors to it.
 - 8 The 3 sub-bands are treated the ones after the 3 others (by order ascending) and, each time, one devotes 4 processors to it.

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