

ZZZZ337 – Checking d' INFO_MODE/ MACRO_MODE_MECA parallèles

Summarized:

This test does not validate a new modelization. It is gauged to function on 4 processors. It is about a data-processing and functional test of the various levels of parallelism available in operators `INFO_MODE` and `MACRO_MODE_MECA`. This test can of course function into sequential but it will then not validate the same features.

1 Problem of reference

This test is copied on the first computation `MACRO_MODE_MECA` of the `fdlv112b` benchmark ($N=5229$ degrees of freedom). One seeks 50 modes into 2,3 or 4 sub-bands according to the cases. One pre-gauges, each modal search, by calls to `parallel INFO_MODE`.

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

- Levels of activated parallelism (S),
- the distribution of processes MPI by sub-bands (déséquilibre de load),
- the combinative one of the numerical parameters (modal solvers and/or linear solvers) and functional (various values of the criterion of Sturm type¹).

Thus, computations suggested (`INFO_MODE + MACRO_MODE_MECA`) are:

- Parallelism on the distribution of the 4 sub-bands (known as 4×1), each one appealing MUMPS into sequential (+ test of `Sturm='GLOBAL'` and modal solver per default for `MACRO_MODE_MECA`).
- Parallelism only on MUMPS (known as 4×1). The sub-bands are treated the ones after the others and they call MUMPS on 4 processors (+ test of `Sturm='GLOBAL'` and modal solver per default for `MACRO_MODE_MECA`).
- Parallelism on 2 levels (known as 2×2). One jointly calculates 2 sub-bands, each one using MUMPS on 2 processors (+ test of `Sturm='LOCAL'` and modal solver per default for `MACRO_MODE_MECA`).
- Parallelism on 2 levels with déséquilibre de load (known as $1 \times 2 + 1 \times 1 + 1 \times 1$). One jointly calculates 3 sub-bands, the first uses MUMPS on 2 processors, the two others on only one (+ test of `Sturm='NON'` and modal solver per default for `MACRO_MODE_MECA`).

Then, only for `MACRO_MODE_MECA`:

- Parallelism 4×1 with `SORENSEN+MULT_FRONT+STURM=' GLOBAL '`,
- Parallelism 4×1 with `TRI_DIAG+MULT_FRONT+STURM=' LOCAL '`,
- Parallelism 4×1 with `JACOBI+MULT_FRONT+STURM=' NON '`.

Then, only for `INFO_MODE`:

- Parallelism 4×1 with `MULT_FRONT`,
- Parallelism 4×1 with `LDLT`.

For each of 7 computations `MACRO_MODE_MECA` parallels, one tests 8 values of NON-regression of the `mode_meca`:

- 4 eigenvalues taken at the boundaries of `under-intervalles2`,
- 4 values of the unit effective modal mass taken arbitrarily, by permuting the components.

For each of 6 parallel computations `INFO_MODE`, one tests of the components 3 values of NON-regression "NB_MODE" of the `sd_table`:

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

1 to test the dedicated communications installation.

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