

PETSC03 - Validation DU solveur PETSc with a preconditionnor of second level

Summary:

This CAS-test makes it possible to validate operation DE the algorithm `GMRES_LMP` solveur PETSC. This algorithm consists in using the iterative solveur `GMRES` with a preconditionnor of first level (here `LDLT_SP`) and a preconditionnor of second level, called preconditionnor with limited memory (Limited Memory To prepack). One returns to the reference material [R6.01.02] for more details on the preconditionnor of second level, like with the documentation of use [U4.50.01].

The test is derived from the CAS-test `mumps02` described in documentation of validation [V1.04.112]). It comprises two modelings, making it possible respectively to check the good performance of the solveur on 1 and 2 processors.

1 Problem of reference

1.1 Geometry

One considers a rectangular plate length 100m and width 50m.



Coordinates of the points (m) :

$$A:(0.,0.,0.)$$

$$B:(100.,0.,0.)$$

$$C:(100.,50.,0.)$$

$$D:(0.,50.,0.)$$

1.2 Material properties

$$E=1.0 E2 N / m^2$$

$$\nu=0.4999$$

1.3 Boundary conditions

One imposes $DX=1, DY=2$ on all the grid

2 Solution

2.1 Sizes and results of reference

The reference variable used is displacement according to the axis X and according to the axis there with the node C.

3 Modeling A

3.1 Characteristics of modeling

Modeling D_PLAN_INCO_UPG

Many nodes: 341

Many meshes: 140 (40 SEG3 and 100 QUAD8).

Modeling A uses L'algorithm GMRES_LMP of the solver PETSC. The parameters of the solver are selected in order to start the construction of the preconditionnor of second level (CE is not an example to be followed).

4 Modeling B

4.1 Characteristics of modeling

Modeling B is identical to modeling With, but calculation is carried out on 2 processors.

5 Summary of the results

This CAS-test shows the good performance DE the algorithm `GMRES_LMP` solvor `PETSC` on 1 and 2 processors.