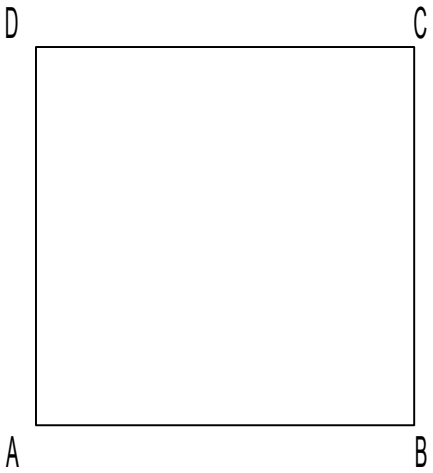
ZZZZ229 - Validation of the order AFFE_CHAR_MECA/LIAISON_SOLIDE + TRAN + ANGL_NAUT

Summary:

This problem tests the got results, by the application of a translation and a rotation, with the operator AFFE_CHAR_MECA/LIAISON_SOLIDE.

1 Problem of reference

1.1 Geometry



The square is in space $[0.,1.]\times[0.,1.]$.

Coordinates of the points (m) :

$A:(0.,0.)$
$B:(1.,0.)$
$C:(1.,1.)$
$D:(0.,1.)$

1.2 Properties of material

- $E=1.0\ E5\ N/m^2$
- $\nu=0.3$
- $\rho=9800.\ kg.m^{-3}$

1.3 Boundary conditions and loadings

- Imposed displacements:
  - Rotation of $90°$ around the point D
  - $ABCD$: $DX=-1\ m$ and $DY=1\ m$

2 Reference solution

2.1 Sizes and results of reference

The variable reference used are displacements according to X and Y point C.

Analytical solution:

- Rotation of $90°$ around the point D : $C(1,1) \rightarrow C(0,2)$
- Translation of (- 1.1): $C(0,2) \rightarrow C(-1,3)$

One from of deduced displacements from reference to the point C :

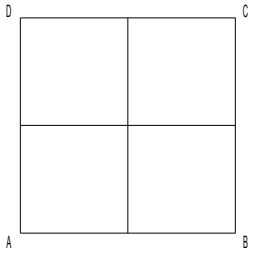
- $DX = -2\,m$
- $DY = 2\,m$

3 Modeling A

3.1 Characteristics of modeling A

Modeling D_PLAN :

Many nodes	9			
Many meshs	12	That is to say:	SEG2	8
			QUAD4	4



3.2 Results

Points	Size	Reference	Tolerance (%)
C	DX	-2.0	0,100
	DY	2.0	0,100

4 Summary of the results

This CAS-test shows the good performance of the operator AFFE_CHAR_MECA used with the keyword LIAISON_SOLIDE in the case of a rotation and of a translation.

Note:

- If rotation is worthless, one can make the same thing with DDL_IMPO.
- If rotation is strong, the “solid” is really not deformed but the constraints are not not forcing worthless (assumption of the small transformations by default).