

ZZZZ161 - Exchange with the format MED, data-processing control

Summary:

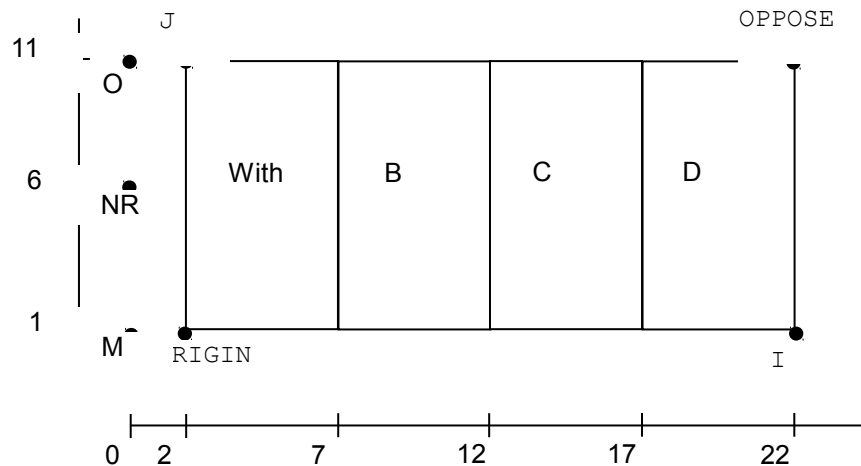
This case test controls the writings of fields to format MED and their second reading by ASTER. It validates in particular the writing of fields nondefinite on the complete field or definite on several types of elements. It also controls the exchange of fields of size.

It should be noted that mechanical calculation is only one pretext and does not have any ambition of validation in oneself.

1 Problem of reference

1.1 Geometry

The field is a rectangle of size 10×20 , separate in 4 slices of 10×5 . 3 points are associated with this rectangle: M , N and O .



1.2 Properties of material

Two materials are used:

The material 1 has the following characteristics:

$$E = 180\,000 \text{ N.m}^{-2}$$

$$\nu = 0,3$$

$$\alpha = 1,5 \cdot 10^{-7}$$

$$\rho = 7700 \text{ kg.m}^{-3}$$

It is applied in the slices A and B .

The second material has the following characteristics:

$$E = 220\,000 \text{ N.m}^{-2}$$

$$\nu = 0,3$$

$$\alpha = 1,6 \cdot 10^{-7}$$

$$\rho = 8300 \text{ kg.m}^{-3}$$

It is applied in the slices C and D .

1.3 Boundary conditions and loadings

At the point *ORIGINE*, displacement is null according to y .

On all the left edge, i.e. between the points *ORIGINE* and *J* normal displacement is null.

On the higher edge, i.e. between the points *J* and *OPPOSE*, the pressure is imposed on 1000.

1.4 Initial conditions

Without object.

2 Reference solution

2.1 Method of calculating used for the reference solutions

Calculation is in static mechanics. It is only one pretext required a result.

2.2 Results of reference

With the node *OPPOSE*, displacement has the following values:

$$u_x = 0,4183044 \quad u_y = 1,639849$$

2.3 Uncertainty on the solutions

Without object.

3 Modeling A

3.1 Characteristics of modeling

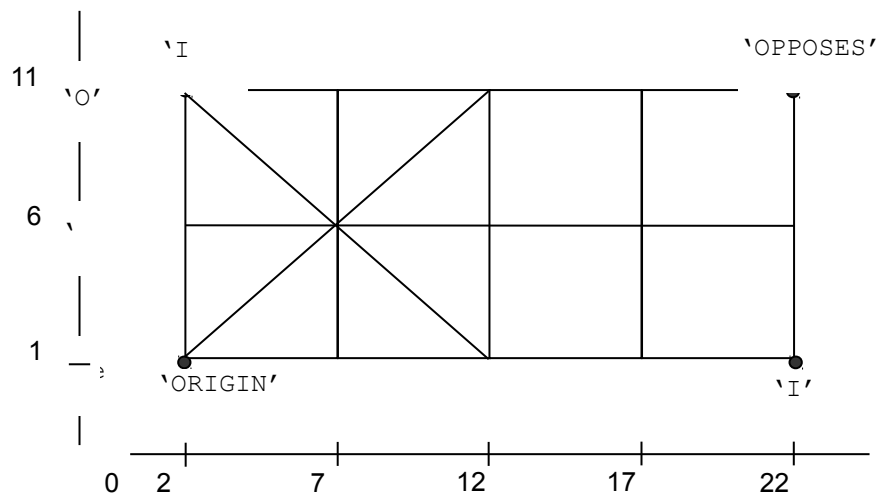
Is calculated in two-dimensional static mechanics, in plane deformation.

3.2 Characteristics of the grid

Slices *A* and *B* are with a grid with 8 triangles TRIA3. They form the group of meshes named 'SORTED'. Slices *C* and *D* are with a grid with 4 quadrangles QUAD4. They form the group of meshes named 'QUAD'.

4 triangles of the slice *B* and 2 quadrangles of the slice *C* are gathered in the group 'MEDIUM'.

The external frontier segments are with a grid with 12 segments SEG2. They are gathered in 4 named groups BORD_INF, BORD_DRO, BORD_SUP and BORD_GAU.



3.3 Features tested

This case tests the various options of writing to the format 'MED' via the order IMPR_RESU. For that we calculate various options complementary to the only displacement and we create a field of size equivalent to the field of displacement to the nodes. The impressions are successively those:

- the field of displacement to the nodes and the stress field at the points of Gauss, expressed on all the grid. That starts the creation of a profile for displacement because it is not defined everywhere: three nœuds *M*, *N* and *O* composition do not rent a value,
- the field of size. It uses the same profile as the field of displacement of the standard result,
- components 'SIXY' and 'SIYY' stress field to the nodes by element 'SIGM_ELNO',
- the indicator of error 'ERRE_ELGA_NORE' on the meshes of the group *MILIEU*. That starts the creation of two profiles because the written values are not it on all the meshes. The first profile relates to the 4 triangles out of the 8 of the total; the second relates to the 2 quadrangles out of the 4 of the total.

The second reading since the format 'MED' is that of the field of displacement to the nodes contained in the field of size.

4 Results of modeling A

4.1 Values tested

The comparison takes place on the value of displacement to the node 'OPPOSES' with a relative tolerance of $10^{-4}\%$.

Identification	Value	Relative variation in %
u_x	0.4183044	$1.55 \cdot 10^{-7}$
u_y	- 1.639849	$2.71 \cdot 10^{-5}$

5 Summary of the results

No particular comment is to be made on this case test. It is only used to ensure the perennality of the writings and readings format MED.