

ZZZZ119 - PROJ_CHAMP for surfaces in 3D

Summarized:

One treats the case of a quarter of cylinder (modelled by shells DKQ) subjected to an internal pressure on a first mesh $ma1$. The field of displacement obtained ($ch1$) is supposed just. One projects this field of displacement on another mesh ($ma2$) of the same quarter of cylinder. One obtains $ch2$. One Re-projects $ch2$ on $ma1$, one obtains $ch1bis$. Result ($ch1bis$) is close to $ch1$ (2% of difference). This validates the method of projection of a field of a surface on the other.

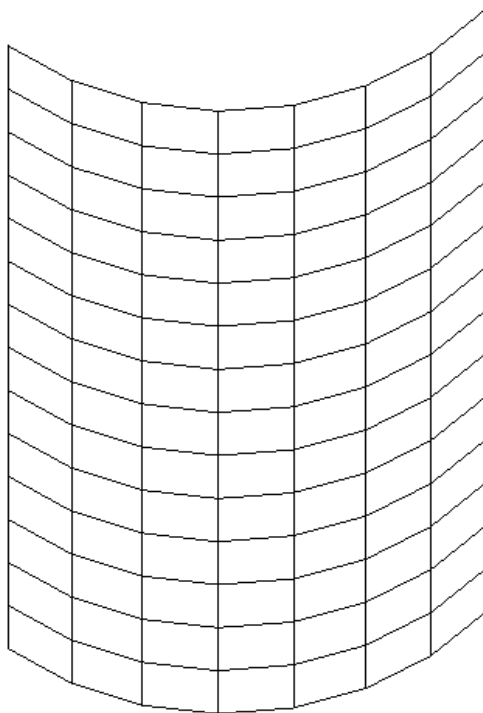
1 Problem of reference

1.1 Geometry

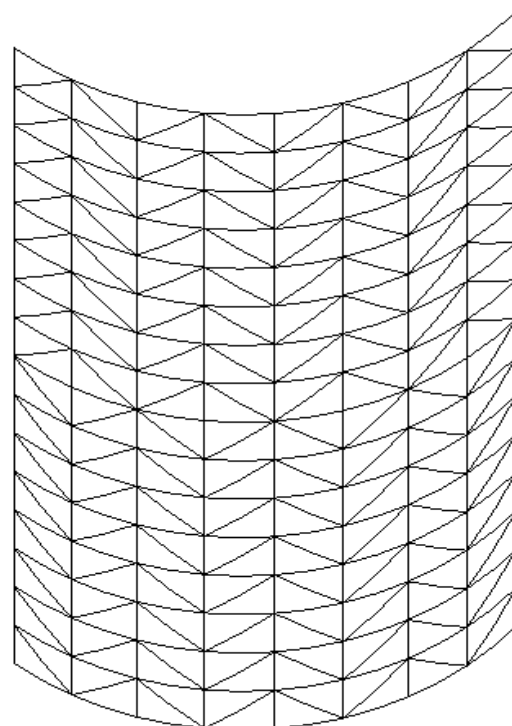
a cylindrical shell (1/4 of cylinder) height $h=40$ and radius $R=10$ and thickness $e=0.2$ is embedded on its line of centers and subjected to an internal pressure $p=2$.

It is with a grid twice:

$ma1$: 7×14 QUAD4
 $ma2$: $8 \times 16 \times 2$ TRIA6



ma1



ma2

1.2 Material properties

$$E = 1.10^6$$

$$\nu = 0.3$$

1.3 Boundary conditions, loading

the nodes group *AB1* is clamped (three displacements and the three rotations are blocked).

$$DX = DY = DZ = 0.$$

$$DRX = DRY = DRZ = 0.$$

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.

The shell is subjected to an internal pressure $p=2$.

1.4 Validated features

the validation relates to method "ELEM in the case of " meshes the surface divings in space $R3$.
One also tests key word VIS_A_VIS for method "ELEM".

2 Reference solution

2.1 Method of calculating used for the reference solution

For the field chl , calculated on the mesh mal , the reference solution is obtained with *Code_Aster* (version 5.02.07).

For the field $chlbis$ obtained by a projection "return ticket" ($mal \rightarrow ma2 \rightarrow mal$), the reference solution is the field chl .

One thus measures the error due to 2 successive projections of fields: $chl \rightarrow ch2 \rightarrow chlbis$

3 Modelization A

Field	Node	CMP	Reference	found Value	Difference (%)
			<i>CHI</i>	<i>CHIBIS</i>	
<i>CHIBIS</i>	<i>N123</i>	<i>DX</i>	- 2.17555E-01	- 2.14000E-01	- 1.634
<i>CHIBIS</i>	<i>N123</i>	<i>DY</i>	- 3.96143E-01	- 3.99026E-01	0.728
<i>CHIBIS</i>	<i>N48</i>	<i>DX</i>	- 9.35364E-02	- 9.18094E-02	- 1.846
<i>CHIBIS</i>	<i>N48</i>	<i>DY</i>	- 1.90742E-01	- 1.93265E-01	1.323
<i>CHIBIS</i>	<i>N66</i>	<i>DX</i>	- 2.17555E-01	- 2.14000E-01	- 1.634

4 Summary of the results

This case test makes it possible to check of the command correct operation PROJ_CHAMP for surfaces in 3D.