

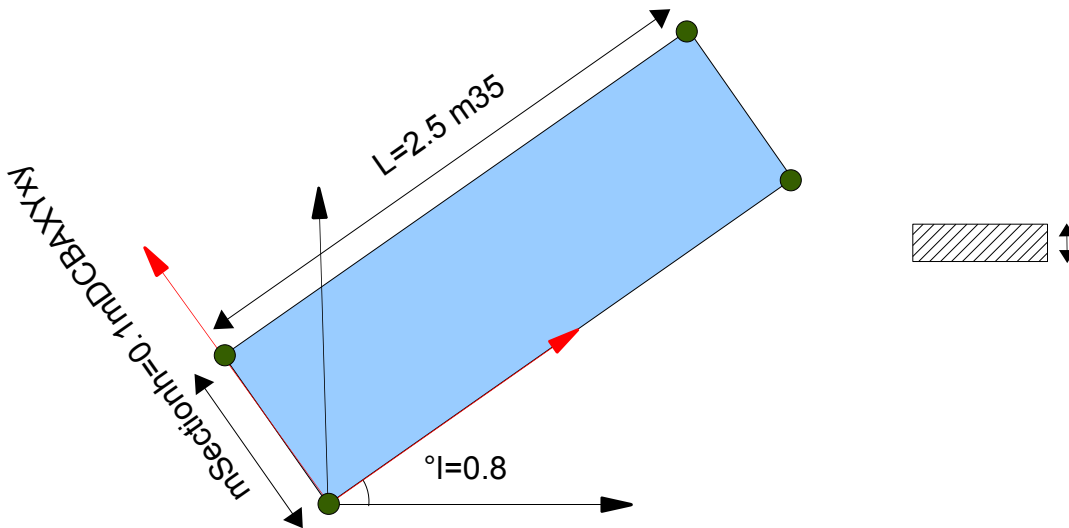
ZZZZ333 – Validation of MODI_REPERE

Summarized:

This benchmark makes it possible to validate key words `REPERE=' COQUE_INTR_UTIL'` and `REPERE=' COQUE_INTR_UTIL'` of the command `MODI_REPERE`.

1 Problem of reference

1.1 Geometry



Material properties

the mechanical properties are the following ones:

- Young modulus $E = 2.1 \times 10^{11} Pa$
- Poisson's ratio $\nu = 0.$

1.2 Boundary conditions and loadings

- Boundary conditions
 - with dimensions AD : fixed support
- Loading
 - with dimensions AD : tractive effort $F_x = 1. \times 10^6 N$
 - with dimensions AD : bending stress $F_z = 0.25 \times 10^6 N$

1.3 Initial conditions

unresolved

2 Méthode de calcul

2.1 reference used for the reference solution

- Force of membrane (in shell) $N_{xx} = \frac{F_x}{l}$
- Bending moment to the point A (in shell) $M_{xx} = \frac{F_z L}{l}$

2.2 Results of reference

Locates *xoy*

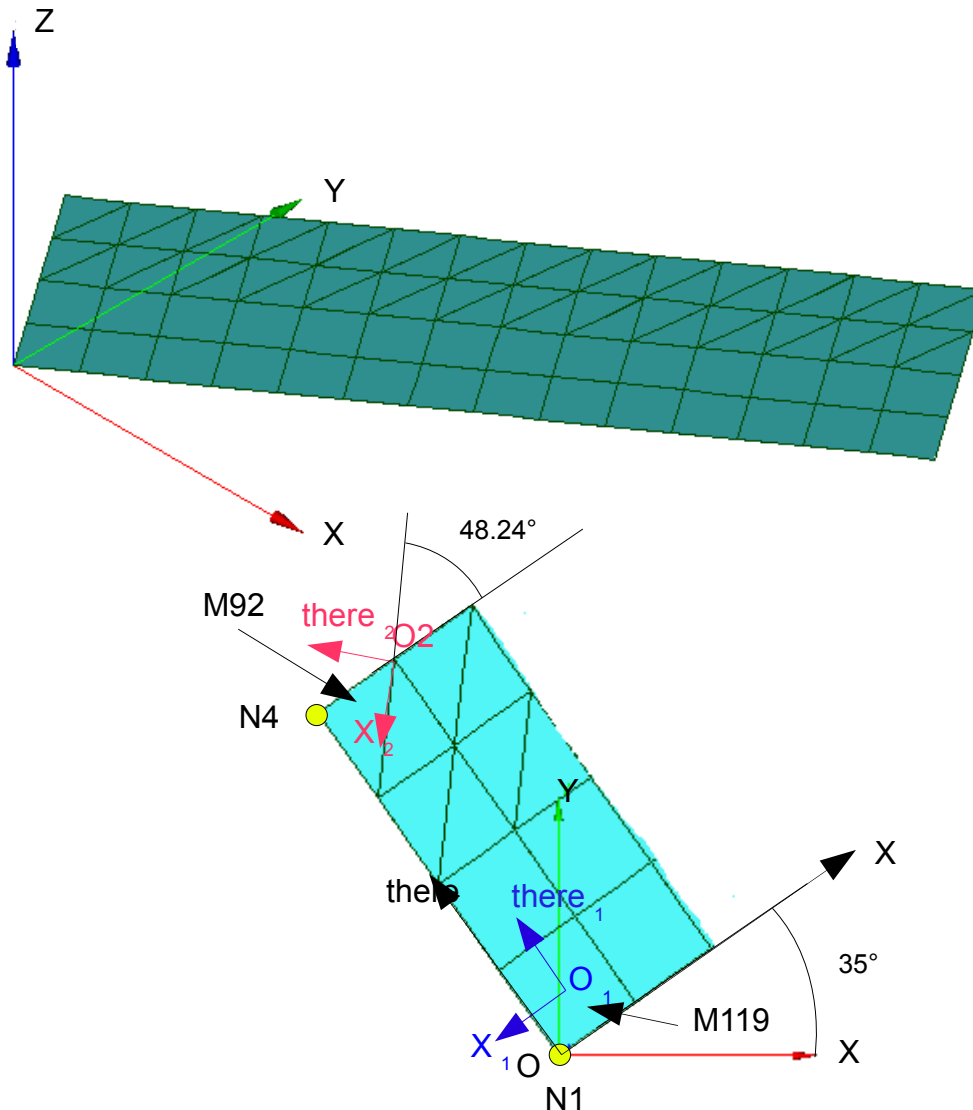
Quantity	locates	Localization	Reference
N_{xx}	<i>xoy</i>	<i>A</i>	$1.25 \times 10^6 N/m$
M_{xx}	<i>xoy</i>	<i>A</i>	$-7.8125 \times 10^5 N$

2.3 Uncertainty on the analytical

solution Solution.

3 Modelization A

3.1 Characteristic of the modelization



3.2 Characteristics of the mesh

Many nodes: 75
Number of meshes and type: 28 QUAD4 56 TRIA3

3.3 Quantities tested and results

Modelization DKT

the quantities are expressed in the reference $x o y$

Mesh	Node	Standard size	of reference	Reference	Tolerance	
M119	N1	EFGE_ELNO	NXX	"ANALYTIQUE"	$1.25 \times 10^6 N/m$	10^{-10}
			NYX	"ANALYTIQUE"	0.0	10^{-6}
			NXY	"ANALYTIQUE"	0.0	10^{-6}
			MXX	"ANALYTIQUE"	$-7.8125 \times 10^5 N$	0.01 %
			MYY	"ANALYTIQUE"	0.0	10^{-4}
			MXY	"ANALYTIQUE"	0.0	50
M92	N4	EFGE_ELNO	NXX	"ANALYTIQUE"	$1.25 \times 10^6 N/m$	10^{-10}
			NYX	"ANALYTIQUE"	0.0	10^{-6}
			NXY	"ANALYTIQUE"	0.0	10^{-6}
			MXX	"ANALYTIQUE"	$-7.8125 \times 10^5 N$	5. %
			MYY	"ANALYTIQUE"	0.0	10^{-6}
			MXY	"ANALYTIQUE"	0.0	300

the quantities are expressed in the reference $x_1 o_1 y_1$

Mesh	Node	Standard size	of reference	Reference	Tolerance	
M119	N1	EFGE_ELNO	NXX	"ANALYTIQUE"	$1.25 \times 10^6 N/m$	10^{-10}
			NYX	"ANALYTIQUE"	0.0	10^{-6}
			NXY	"ANALYTIQUE"	0.0	10^{-6}
			MXX	"ANALYTIQUE"	$-7.8125 \times 10^5 N$	0.01 %
			MYY	"ANALYTIQUE"	0.0	10^{-6}
			MXY	"ANALYTIQUE"	0.0	50

the quantities are expressed in the reference $x_2 o_2 y_2$

Mesh	Node	Standard size	of reference	Reference	Tolerance	
M92	N4	EFGE_ELNO	NXX	"ANALYTIQUE"	$5.4471 \times 10^5 N/m$	10^{-4}
			NYY	"ANALYTIQUE"	$6.9553 \times 10^5 N/m$	10^{-4}
			NXY	"ANALYTIQUE"	$6.2101 \times 10^5 N/m$	10^{-4}
			MXX	"ANALYTIQUE"	$-3.4654 \times 10^5 N$	10^{-2}
			MYY	"ANALYTIQUE"	$-4.3471 \times 10^5 N$	10^{-2}
			MXY	"ANALYTIQUE"	$-3.8813 \times 10^5 N$	10^{-2}

Modelization Q4GG

the quantities are expressed in the reference $x o y$

Mesh	Not	Standard size	of reference	Reference	Tolerance	
M119	3	SIEF_ELGA	NXX	"NON_REGRESSION"	$1.25 \times 10^6 N/m$	10^{-10}
			NYY	"NON_REGRESSION"	0.0	10^{-10}
			NXY	"NON_REGRESSION"	0.0	10^{-10}
			MXX	"NON_REGRESSION"	$-7.53348 \times 10^5 N$	10^{-10}
			MYY	"NON_REGRESSION"	0.0	10^{-10}
			MXY	"NON_REGRESSION"	0.0	10^{-10}
M92	1	SIEF_ELGA	NXX	"NON_REGRESSION"	$1.25 \times 10^6 N/m$	10^{-10}
			NYY	"NON_REGRESSION"	0.0	10^{-10}
			NXY	"NON_REGRESSION"	0.0	10^{-10}
			MXX	"NON_REGRESSION"	$-7.53349 \times 10^5 N$	10^{-10}
			MYY	"NON_REGRESSION"	0.0	10^{-10}
			MXY	"NON_REGRESSION"	0.0	10^{-10}

the quantities are expressed in the reference $x_1 o_1 y_1$

Mesh	Not	Standard size	of reference	Reference	Tolerance	
M119	3	SIEF_ELGA	NXX	"NON_REGRESSION"	$1.25 \times 10^6 N/m$	10^{-10}
			NYX	"NON_REGRESSION"	0.0	10^{-10}
			NXY	"NON_REGRESSION"	0.0	10^{-10}
			MXX	"NON_REGRESSION"	$-7.5346 \times 10^5 N$	10^{-10}
			MYY	"NON_REGRESSION"	0.0	10^{-10}
			MXY	"NON_REGRESSION"	0.0	10^{-10}

the quantities are expressed in the reference $x_2 o_2 y_2$

Mesh	Not	Standard size	of reference	Toléranc	Reference	
M92	1	SIEF_ELGA	NXX	"NON_REGRESSION"	$5.54471 \times 10^5 N/m$	10^{-10}
			NYX	"NON_REGRESSION"	$6.95529 \times 10^5 N/m$	10^{-10}
			NXY	"NON_REGRESSION"	$6.21007 \times 10^5 N/m$	10^{-10}
			MXX	"NON_REGRESSION"	$-3.34169 \times 10^5 N$	10^{-10}
			MYY	"NON_REGRESSION"	$-4.19180 \times 10^5 N$	10^{-10}
			MXY	"NON_REGRESSION"	$-3.74269 \times 10^5 N$	10^{-10}

4 Summary of the results

the got results are satisfactory.