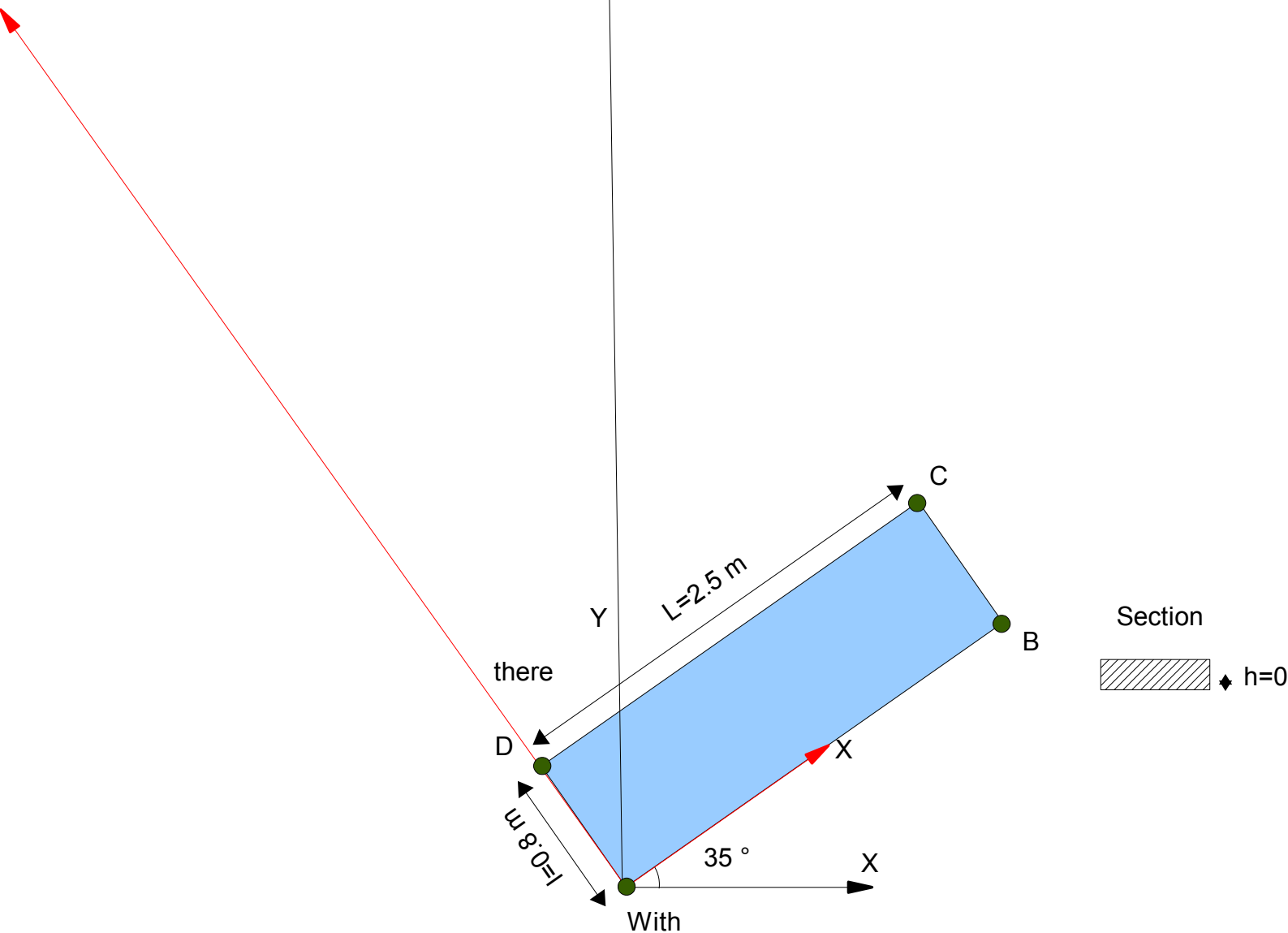


ZZZZ333 – Validation of MODI_REPERE

Summary:

This CAS-test makes it possible to validate the keywords REPERE=' COQUE_INTR_UTIL' and REPERE=' COQUE_INTR_UTIL' order MODI_REPERE.



1 Problem of reference

1.1 Geometry

Material properties

The mechanical properties are the following ones:

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

1.2 Boundary conditions and loadings

- Boundary conditions
 - dimensioned AD : embedding

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.

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- Loading
 - dimensioned AD : tractive effort $F_x = 1. \times 10^6 N$
 - dimensioned AD : bending stress $F_z = 0.25 \times 10^6 N$

1.3 Initial conditions

without

2 Reference solution

2.1 Method of calculating used for the reference solution

- Effort of membrane (in hull) $N_{xx} = \frac{F_x}{l}$
- Bending moment at the point with (in hull) $M_{xx} = \frac{F_z L}{l}$

2.2 Results of reference

Reference mark *xoy*

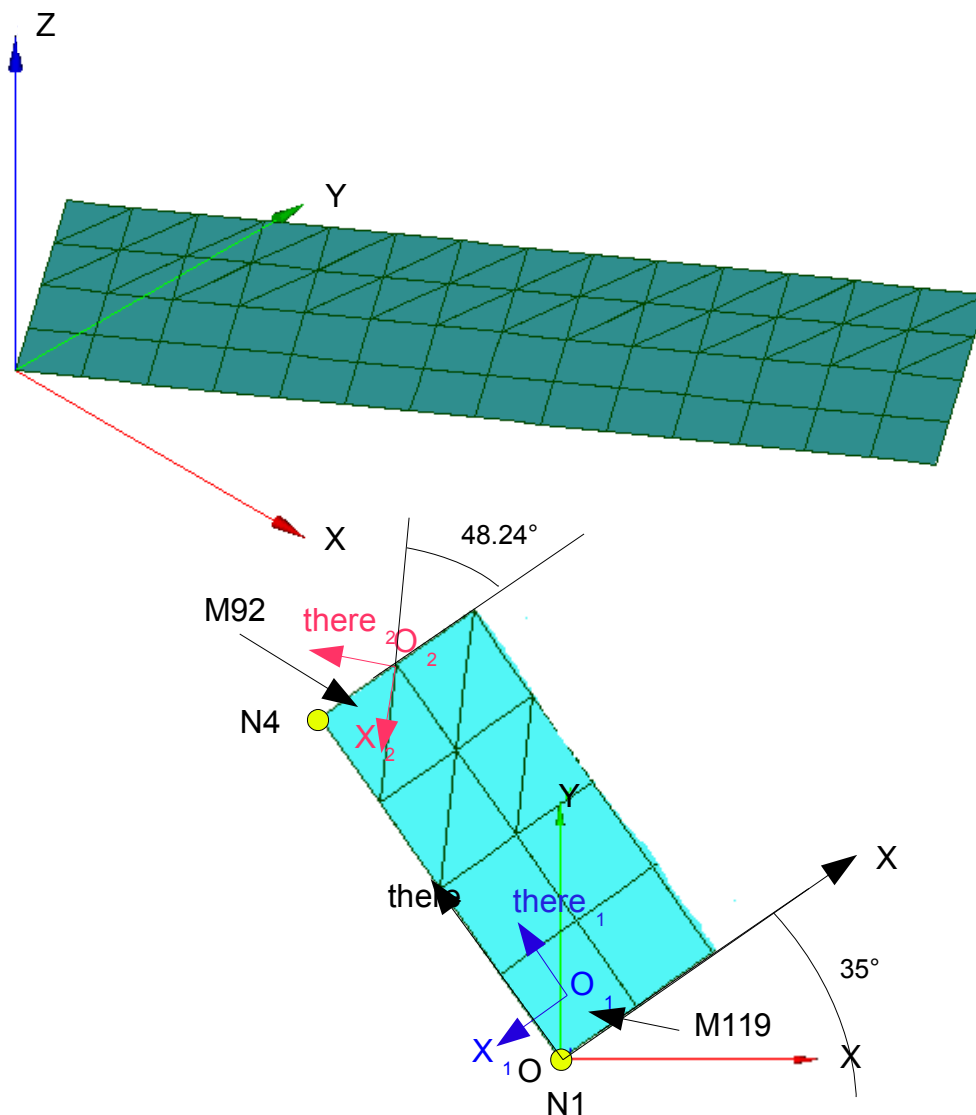
Size	reference mark	Localization	Reference
N_{xx}	<i>xoy</i>	<i>A</i>	$1.25 \times 10^6 \text{ N/m}$
M_{xx}	<i>xoy</i>	<i>A</i>	$-7.8125 \times 10^5 \text{ N}$

2.3 Uncertainty on the solution

Analytical solution.

3 Modeling A

3.1 Characteristics of modeling



3.2 Characteristics of the grid

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

3.3 Sizes tested and results

Modeling DKT

The sizes are expressed in the reference mark xoy

Mesh	Node	Size	Type of reference	Reference	Tolerance	
M119	N1	EFGE_ELNO	NXX	'ANALYTICAL'	$1.25 \times 10^6 N/m$	10^{-10}
			NYX	'ANALYTICAL'	0.0	10^{-6}
			NXY	'ANALYTICAL'	0.0	10^{-6}
			MXX	'ANALYTICAL'	$-7.8125 \times 10^5 N$	0.01 %
			MYY	'ANALYTICAL'	0.0	10^{-4}
			MXZ	'ANALYTICAL'	0.0	50
M92	N4	EFGE_ELNO	NXX	'ANALYTICAL'	$1.25 \times 10^6 N/m$	10^{-10}
			NYX	'ANALYTICAL'	0.0	10^{-6}
			NXY	'ANALYTICAL'	0.0	10^{-6}
			MXX	'ANALYTICAL'	$-7.8125 \times 10^5 N$	5. %
			MYY	'ANALYTICAL'	0.0	10^{-6}
			MXZ	'ANALYTICAL'	0.0	300

The sizes are expressed in the reference mark $x_1o_1y_1$

Mesh	Node	Size	Type of reference	Reference	Tolerance	
M119	N1	EFGE_ELNO	NXX	'ANALYTICAL'	$1.25 \times 10^6 N/m$	10^{-10}
			NYX	'ANALYTICAL'	0.0	10^{-6}
			NXY	'ANALYTICAL'	0.0	10^{-6}
			MXX	'ANALYTICAL'	$-7.8125 \times 10^5 N$	0.01 %
			MYY	'ANALYTICAL'	0.0	10^{-6}
			MXZ	'ANALYTICAL'	0.0	50

The sizes are expressed in the reference mark $x_2 o_2 y_2$

Mesh	Node	Size	Type of reference	Reference	Tolerance	
M92	N4	EFGE_ELNO	NXX	'ANALYTICAL'	$5.4471 \times 10^5 N/m$	10^{-4}
			NYX	'ANALYTICAL'	$6.9553 \times 10^5 N/m$	10^{-4}
			NXY	'ANALYTICAL'	$6.2101 \times 10^5 N/m$	10^{-4}
			MXX	'ANALYTICAL'	$-3.4654 \times 10^5 N$	10^{-2}
			MYY	'ANALYTICAL'	$-4.3471 \times 10^5 N$	10^{-2}
			MXY	'ANALYTICAL'	$-3.8813 \times 10^5 N$	10^{-2}

Modeling Q4GG

The sizes are expressed in the reference mark $x o y$

Mesh	Not	Size	Type 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'	$-7.53348 \times 10^5 N$	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}
			NYX	'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 sizes are expressed in the reference mark $x_1 o_1 y_1$

Mesh	Not	Size	Type 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 sizes are expressed in the reference mark $x_2 o_2 y_2$

Mesh	Not	Size	Type of reference	Reference	Toléranc	
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.