

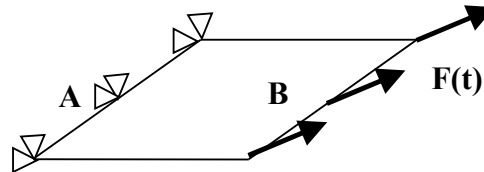
SDLS116 – Plate in transitory loading, treated in explicit dynamics

Summarized:

This test validates by the operator `modelization` DKT for a transient computation with an explicit diagram of numerical integration `DYNA_NON_LINE` and with the diagonalized mass matrix (`MASS_MECA_DIAG`). The square plate is requested by a force linear on one on the sides and linear in time. The results are compared with those obtained by software *EUROPLEXUS*.

1 Problem of reference

1.1 Geometry



Plates square :
Length: $l = 1.0 \text{ m}$
Thickness: $e = 0.1 \text{ m}$

1.2 Properties of the material

Young's modulus, $E = 4.388 \cdot 10^{10} \text{ N/m}^2$

Poisson's ratio, $\nu = 0.0$

Density, $\rho = 2500 \text{ kg/m}^3$

1.3 Boundary conditions and loadings

On with dimensions one A one embeds displacements in x and z $u_x = u_z = 0.0$, as well as rotations $u_{Rx} = u_{Ry} = u_{Rz} = 0.0$. Then, one applies the linear force to with dimensions one B in the direction $(1.0, 0.0, 1.0)$, linear in time:

$$F(t) = F_0 \cdot t$$

where F_0 is the amplitude $F_0 = 1.6166 \cdot 10^5 \text{ N}$.

1.4 Initial conditions

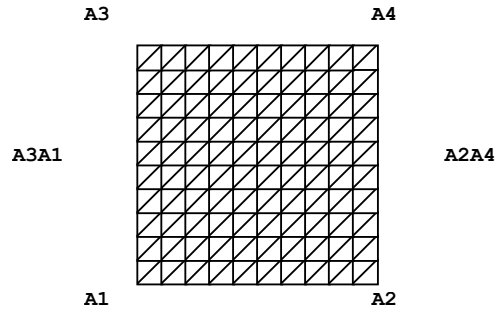
At the beginning displacements and the velocities are worth zero everywhere.

2 Reference solution

the reference solution is obtained by software *EUROPLEXUS* (see the corresponding command file, *.epx*).

3 Modelization A

3.1 Characteristic of the modelization



Modelization: **DKT**

Boundary conditions:

```
A - DDL_IMPO= (_F (GROUP_NO=' A3A1', DX=0.0, DZ=0.0, DRX=0.0, DRY=0.0, DRZ=0.0, ),
```

```
_F (GROUP_NO=' A1', DX=0.0, DY=0.0, DZ=0.0, DRX=0.0, DRY=0.0 DRZ=0.0, ), )
```

```
B - FORCE_ARETE = _F (GROUP_MA = ' A2A4', FX=1.0, FZ=1.0)
```

3.2 Characteristic of the mesh

Nodes: 121

Meshes: 200 TRIA3

3.3 Quantities tested and results

Identification	Reference	Aster	% difference
Displacement DZ in $N2$	1.1751D-02	1.1781D-02	0.25
Rotational speed DRX in $N2$	4.5783	4.6247	1.02

4 Summary of the results

This test compares the results of an analysis of the fast dynamics (with operator `DYNA_NON_LINE`) with those obtained with software *EUROPLEXUS*. The variation which can nevertheless reach 1% on a very simple example (few degrees of freedom and linear behavior), the test highlights also a difference of the processing for the two codes.