

PRACTICE 4 Exercise 1
COMPUTATIONAL STRUCTURAL MECHANICS AND DYNAMICS
Marcos Boniquet Aparicio

It's chosen a problem type: *Revolutions Shell*

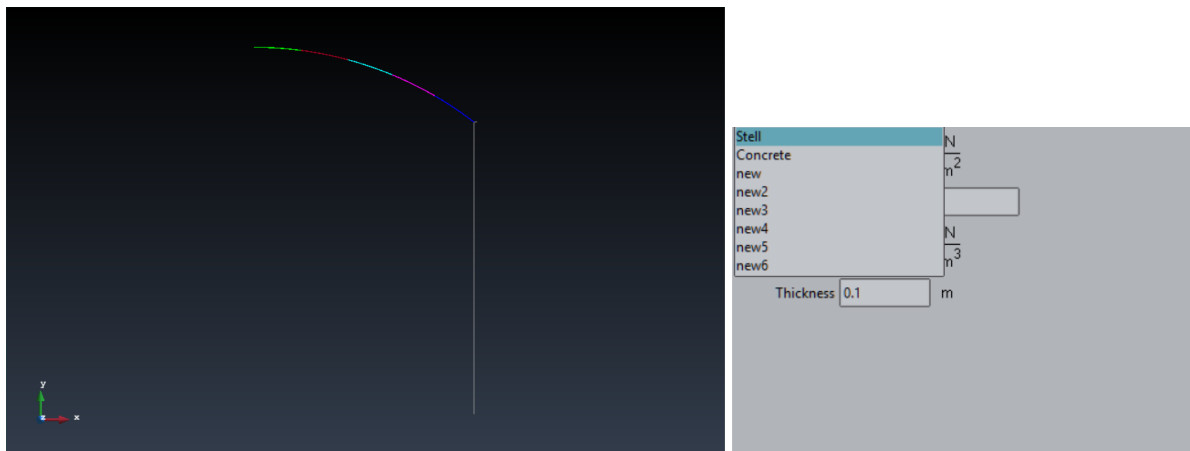
Material, self weight condition, and constraints are settled.

$$E=2,5*10^{10} \text{ Pa}$$

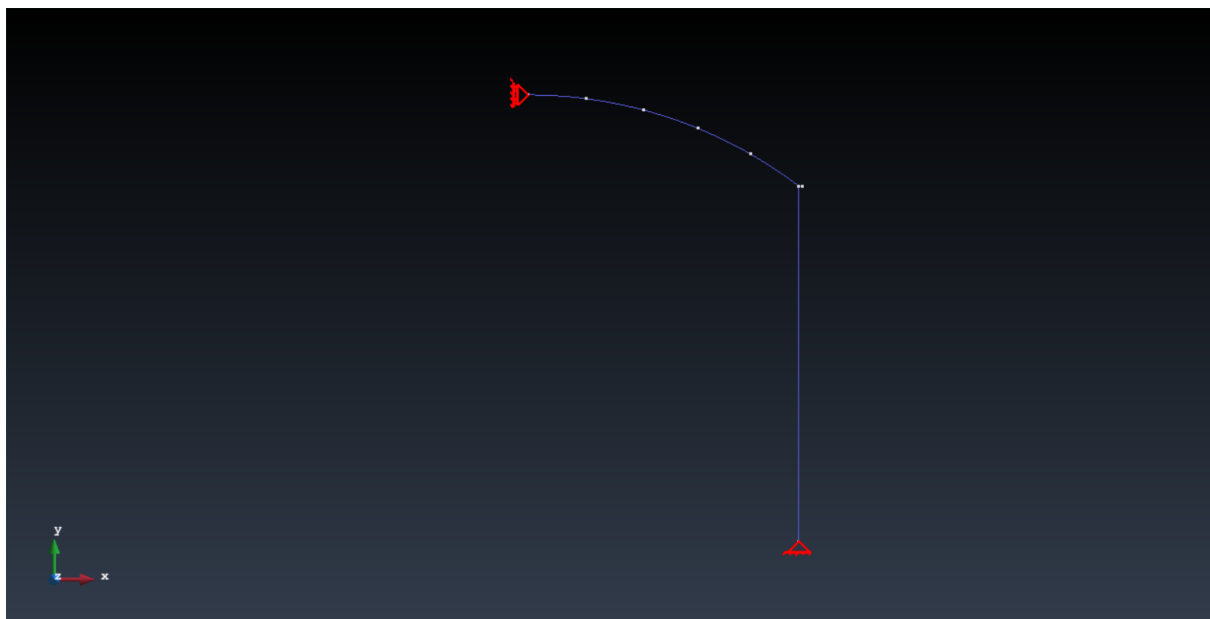
$$\nu=0,15$$

$$p=1*10^4 \text{ N/m}^2$$

The cupola is divided in 5 elements, each with different thickness material associated, simulating a continuous variation of thickness from 0.12m to 0.30m.



The constraint are *x*-displacement 0 at top left (symmetry condition) and *x,y*-displacement is 0 at bottom.



PRACTICE 4 Exercise 1
COMPUTATIONAL STRUCTURAL MECHANICS AND DYNAMICS
Marcos Boniquet Aparicio

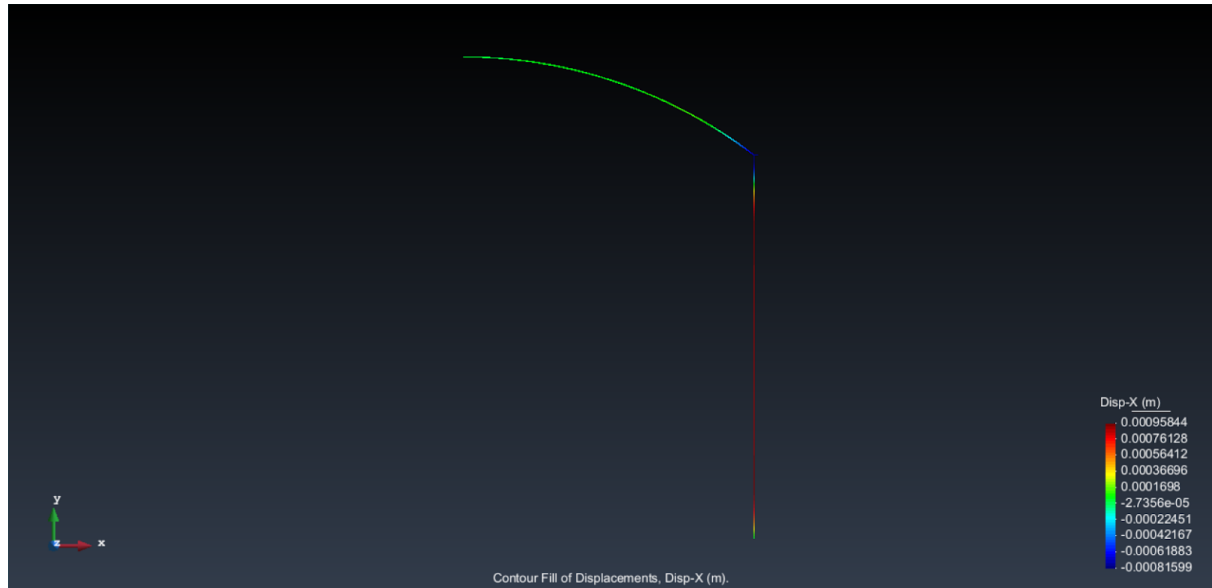
A tow-node element mesh is generated:

Num. of Linear elements=1125

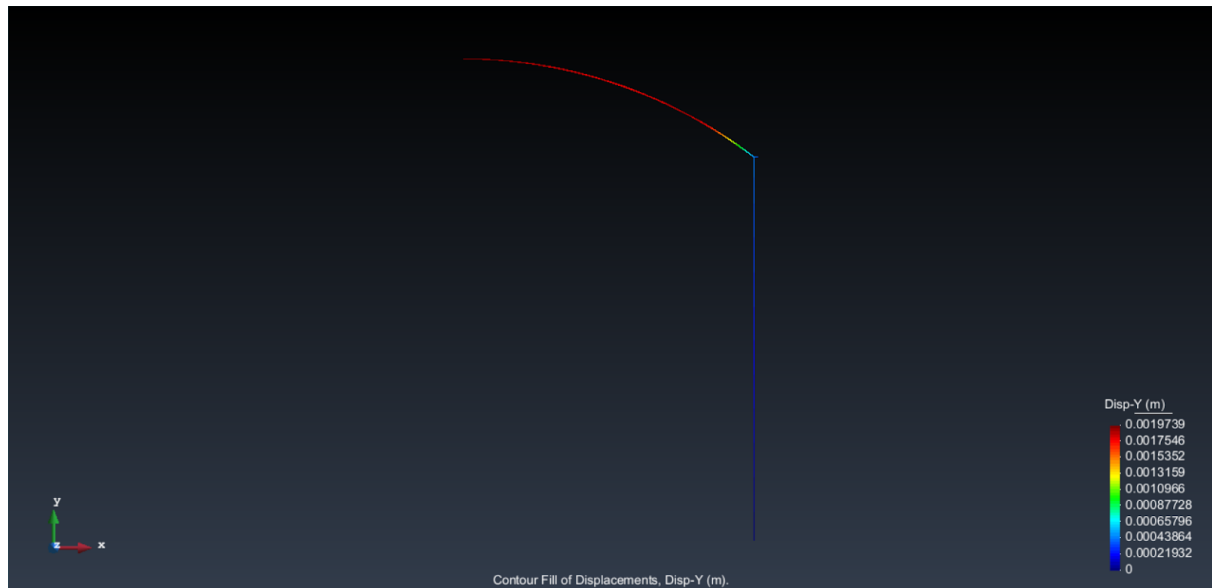
Num. of nodes=1126

Displacements:

Almost 1mm on x-axis at the side of the vessel:

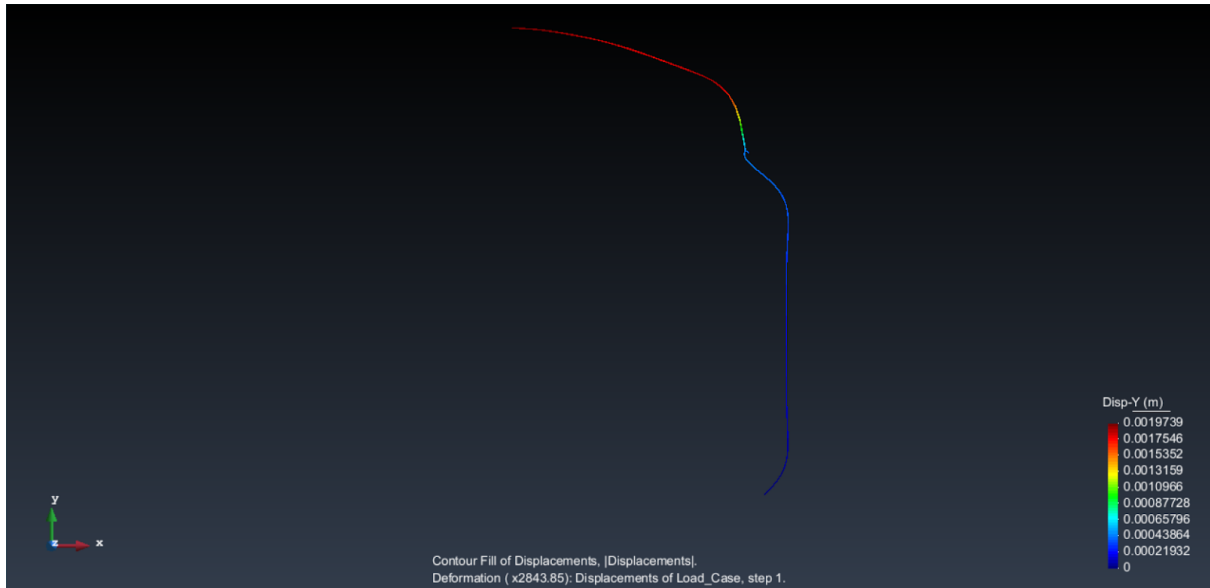


Almost 2 millimeters at the top of the vessel (y displacement):

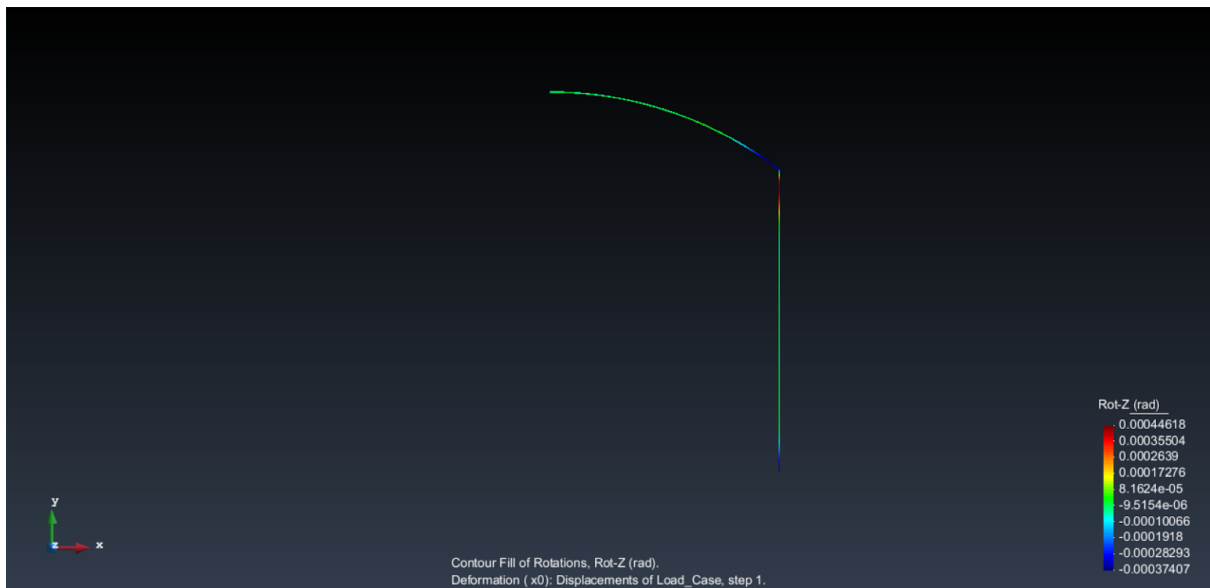


PRACTICE 4 Exercise 1
COMPUTATIONAL STRUCTURAL MECHANICS AND DYNAMICS
Marcos Boniquet Aparicio

The shape seems quite as expected when scaled up:



Rotation in z axis:



PRACTICE 4 Exercise 1
COMPUTATIONAL STRUCTURAL MECHANICS AND DYNAMICS
Marcos Boniquet Aparicio

When focusing this problem as a 3D we require COMPASS RAMSERIES professional version:

