

PRACTICE 3 Exercise 3
COMPUTATIONAL STRUCTURAL MECHANICS AND DYNAMICS
Marcos Boniquet Aparicio

It's chosen a problem type: *Plates*

Material, self weight condition, and constraints are settled.

$$E=3*10^{10} \text{ Pa}$$

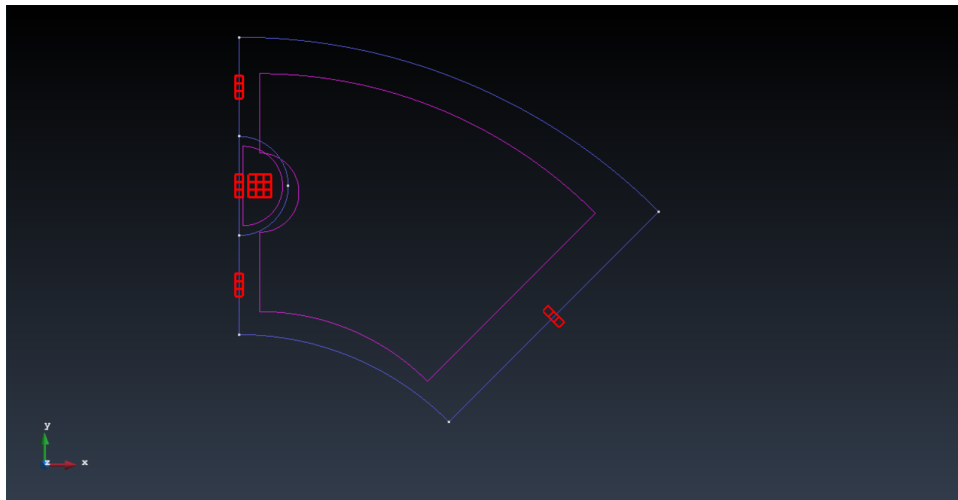
$$\nu=0,2$$

$$\text{Load: } q=1*10^4 \text{ N/m}^2$$

$$\text{thickness}=0,25 \text{ m}$$

$$\gamma=2.4*10^4 \text{ N/m}^3$$

An eighth of the circle is chosen as domain. To preserve symmetry, constraint θ_x on the left lines and θ_x on **local** right axis is set to 0.



It is made the assumption that displacements and rotations are 0 at the top of the columns. A whole selection of the geometry as a domain only would require much high computer processing, so this is chosen as an optimised version.

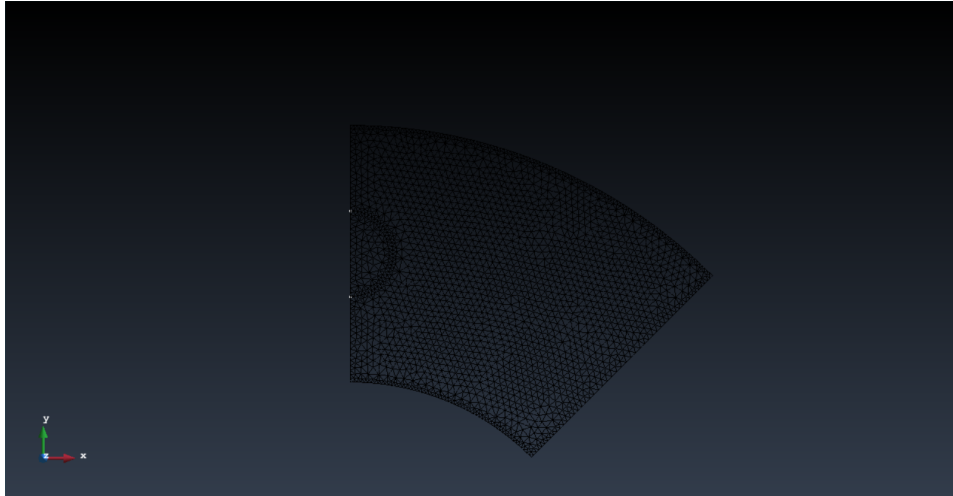
The rotation on the right side is 0 with respect to the orthogonal of the side, is assumed symmetry. So there's a need to build a new coordinate system to proceed.

Even being the material at the top of the columns and outside it the same plate, it is required a boundary in order to be capable to settle the constraints.

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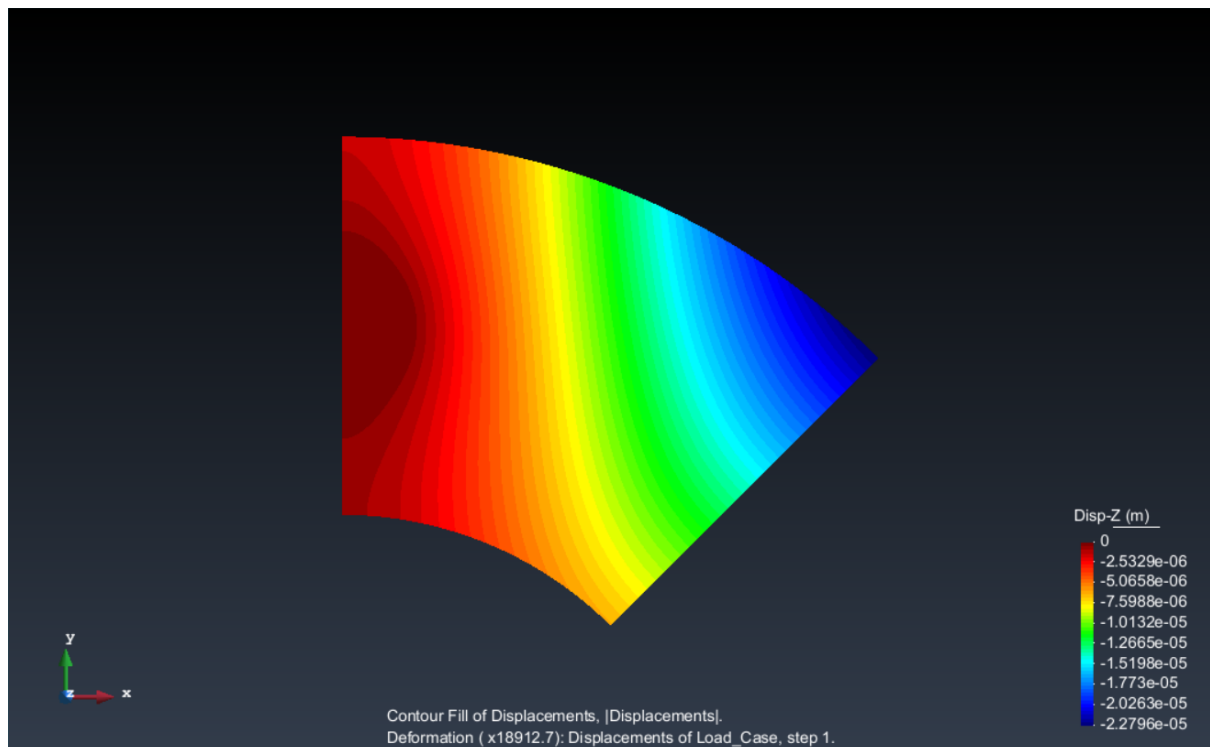
The following step is to set a mesh:

Quadratic triangular R-M mesh:
Num. of Triangle elements=4242
Num. of nodes=8761
25610 doF



Displacements:

z-axis



Displacement in x and y is 0. Max. displacement in top-right corner.