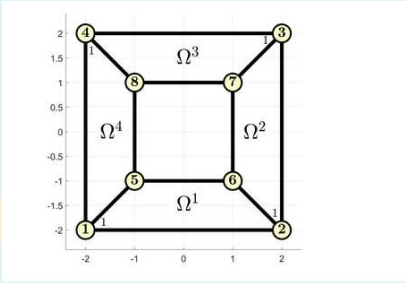
P4

Consider the domain shown above with the four quadrilateral finite elements, nodes and local and global numbering plotted there (the side lengths are measured in meters).The domain is made of an elastic material with Young Modulus $E = 10^8 \frac{N}{m^2}$, Poisson ratio $\nu = 0.25$ and thickness $th = 0.01m$. The piece is fixed in the all left exterior boundary while an horizontal force load $[530; 0]\frac{N}{m}$ is applied on the right exterior boundary.

(a) (4 points) The maximum of the absolute value of the vertical values of the displacements is




- 3.7948e-04
- 4.0008e-04
- 6.6437e-04
- 3.4716e-04
- Leave it empty (no penalty) ✖

La resposta correcta és: 3.7948e-04

Hint1: the maximum of the absolute value of the of the horizontal displacements is 3.2981e-03

(b) (3 points) Now suppose that, instead of a constant force load, a **linear force** load is applied on the right exterior boundary, with values of force ranging from $[530; 0]\frac{N}{m}$ on the global node $2$ to $[0; 0]\frac{N}{m}$ on the global node$3$. Now the maximum of the absolute value of the vertical values of the displacements is

- 1.4079e-03
- Leave it empty (no penalty) ✖
- 2.0832e-03
- 1.1039e-03
- 1.1437e-03

La resposta correcta és: 1.1039e-03

Hint2:the maximum of the absolute value of the of the horizontal displacements is 2.5632e-03

(c) (3 points) Now supose that no external loads are applied, and just the own weigth of the piece is taken into account. Assume that the density of the material is such that the vector of local element forces $F_e$ can be taken constant for all the elements , with value Fe=[0; -340; 0; -340; 0; -340; 0; -340], the absolute value of the vertical values of the displacements is

- 3.4003e-02
- Leave it empty (no penalty) ✖
- 8.5464e-03
- 2.4006e-02
- 1.7753e-02

La resposta correcta és: 1.7753e-02

Hint3: the maximum of the absolute value of the of the horizontal displacements is 6.3286e-03