Master Of Science in Computational Mechanics

Computational Structural Mechanics and Dynamics

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(12 April 2019)

Assignment 8

(Hyperbolic Shell)

Analyze the following concrete hyperbolic Shell under self weight. Explain the behavior of all the Stresses presented. t = 0.1

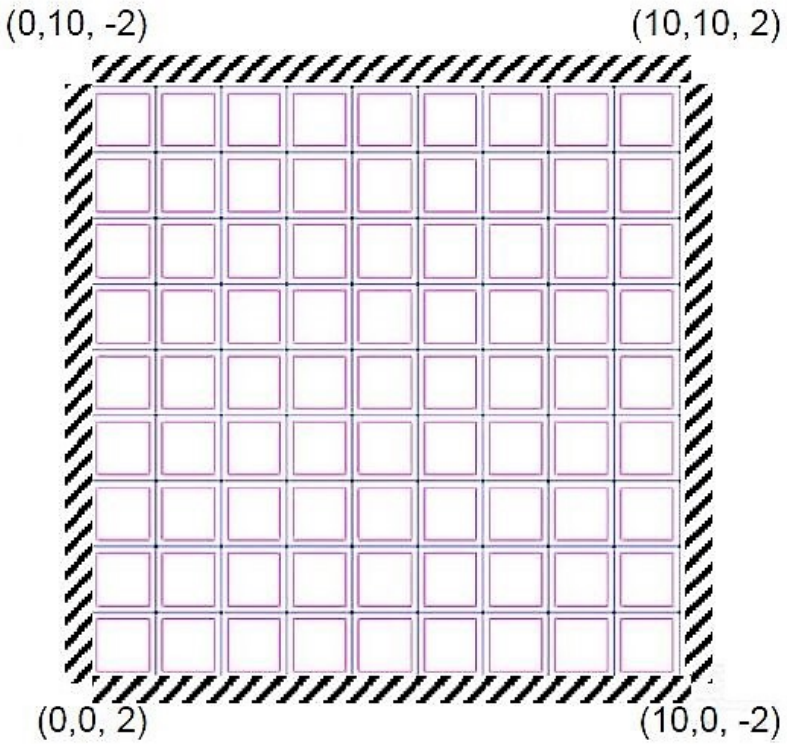


Figure 1: Problem geometry

As seen in figure above geometry was constructed in GiD with essential boundary conditions and material. The geometry was discretized in 10 x 10 element configuration as seen in figure 2.

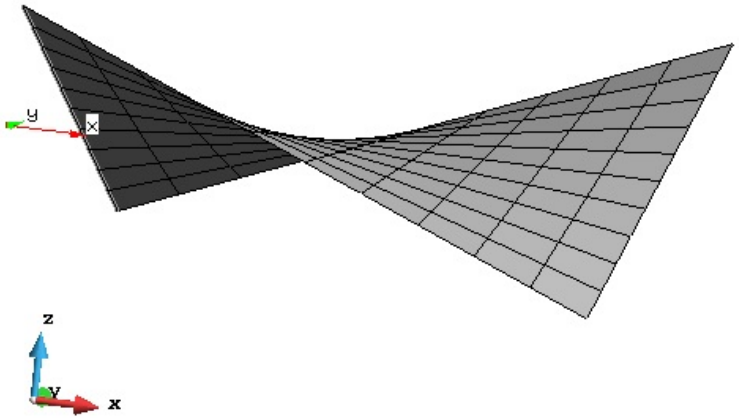
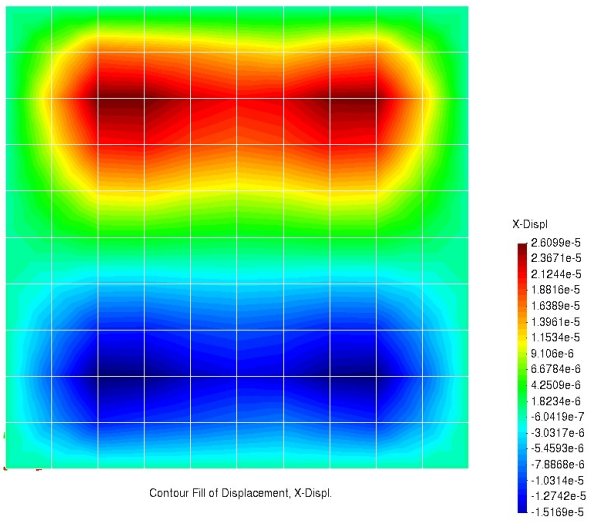


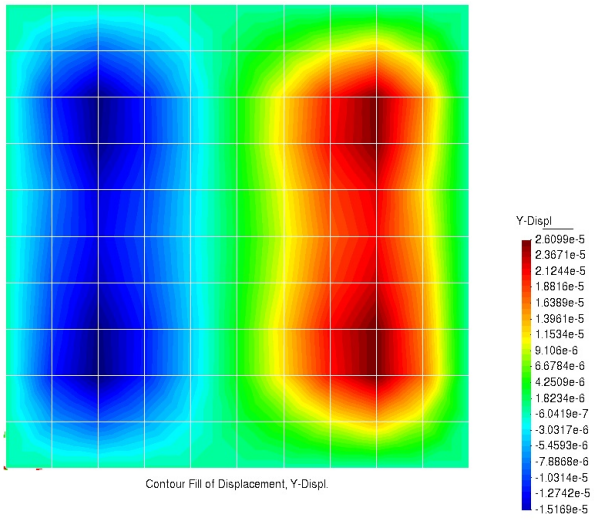
Figure 2: Meshing

The calculations were performed in MATLab with MATFEM. again the results were plotted in post-processing part of GiD. as it can be seen in figure 4 maximum displacement occurs in z direction as the shell is suspended in xy direction causing deflection due to weight in z direction in the central region of shell.

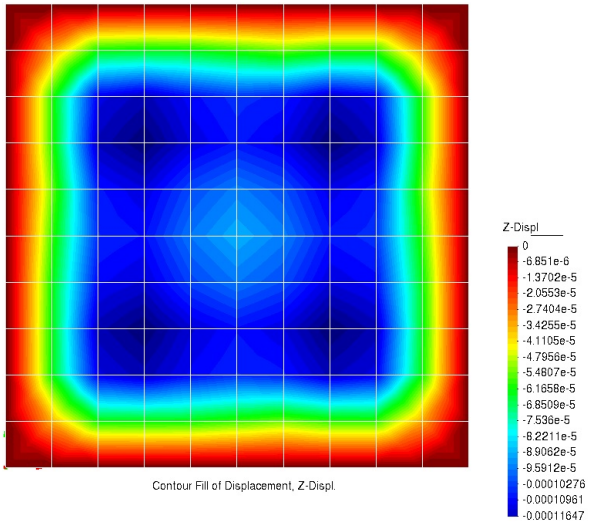
Below are the couture for the rotational strain as the geometry is not i the same plane.



(a) x Displacement

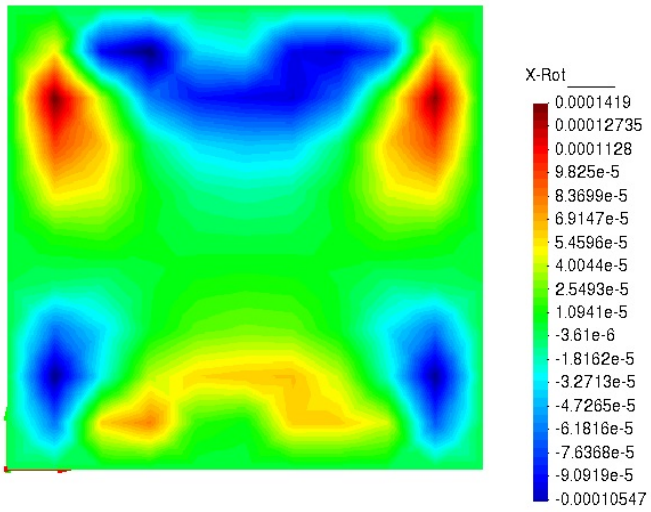


(b) y Displacement

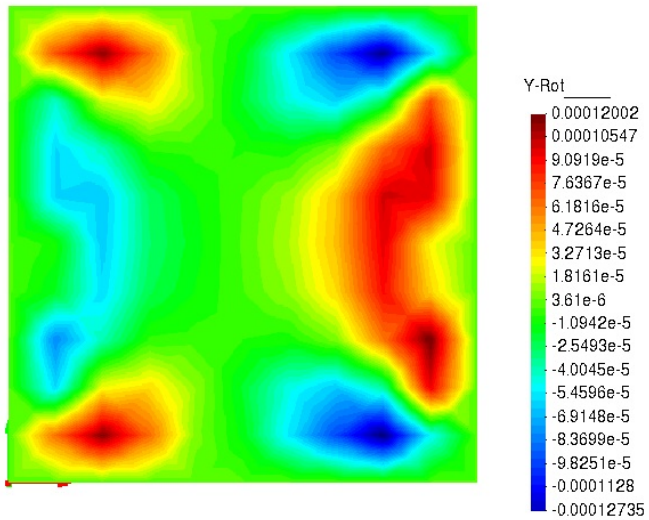


(c) z Displacement

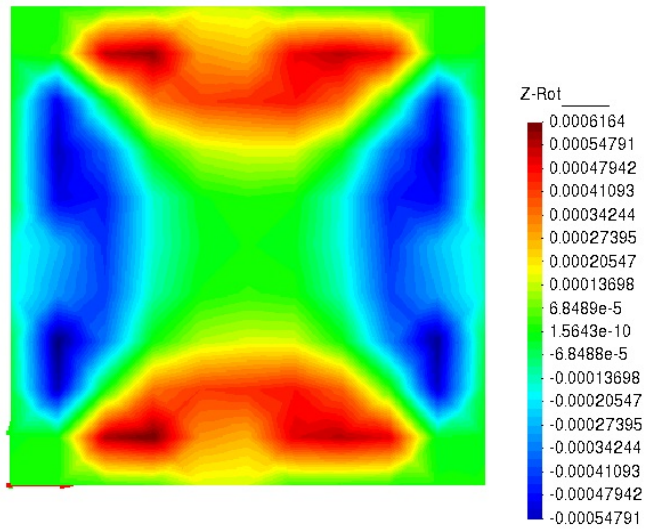
Figure 3: Displacement



(a) x Displacement



(b) y Rotation



(c) z Rotation

Figure 4: Couture for the rotational