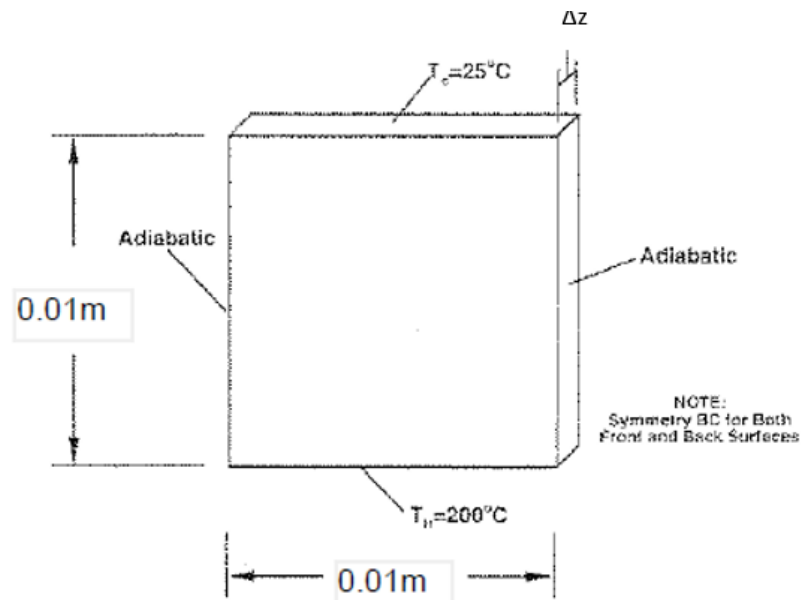Japnit Singh Sethi

Case 1:

1. **Velocity Vector Map**:
   Here from the velocity vector graph we can see that it is revolving in a clockwise direction, with highest velocities towards the centre and then decreasing as it moves farther from the center, which is possible due to the right and left walls being adiabatic and due to the decrease in density in the direction of gravity as a result the density on bottom is lower than on top and thus creating an unstable free convection that starts from bottom and moves up and thus such circulation pattern arises.
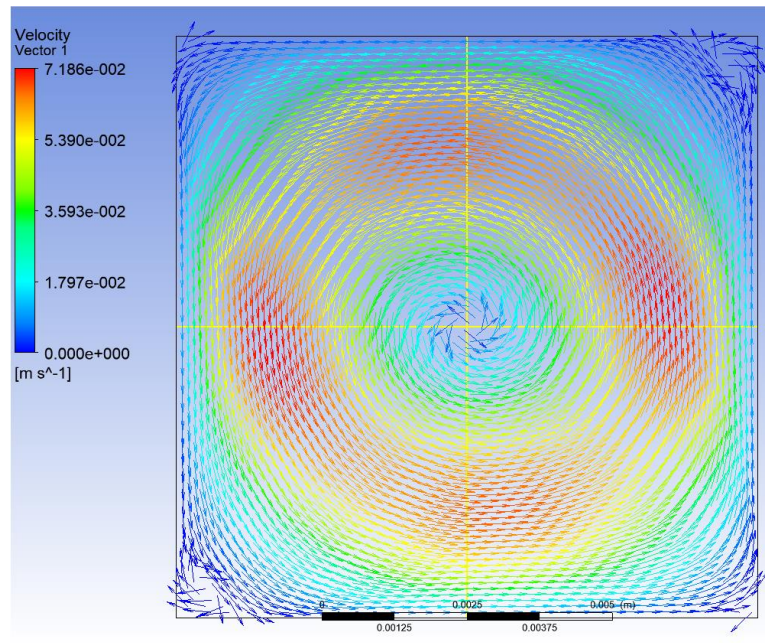
2. Temperature Contour:

Boundary Conditions: Top Face: 25°C, Bottom Face: 200°C, Left and Right Faces: Adiabatic Wall

From our Temperature contour we can see that the temperature on the top is cooler than the temperature on the bottom face, and as the gravity is in the down direction, density decreases in the downward direction, and thus based on the temperature relation and the density relation we can see it forms a free convection with heat transfer from bottom to top.
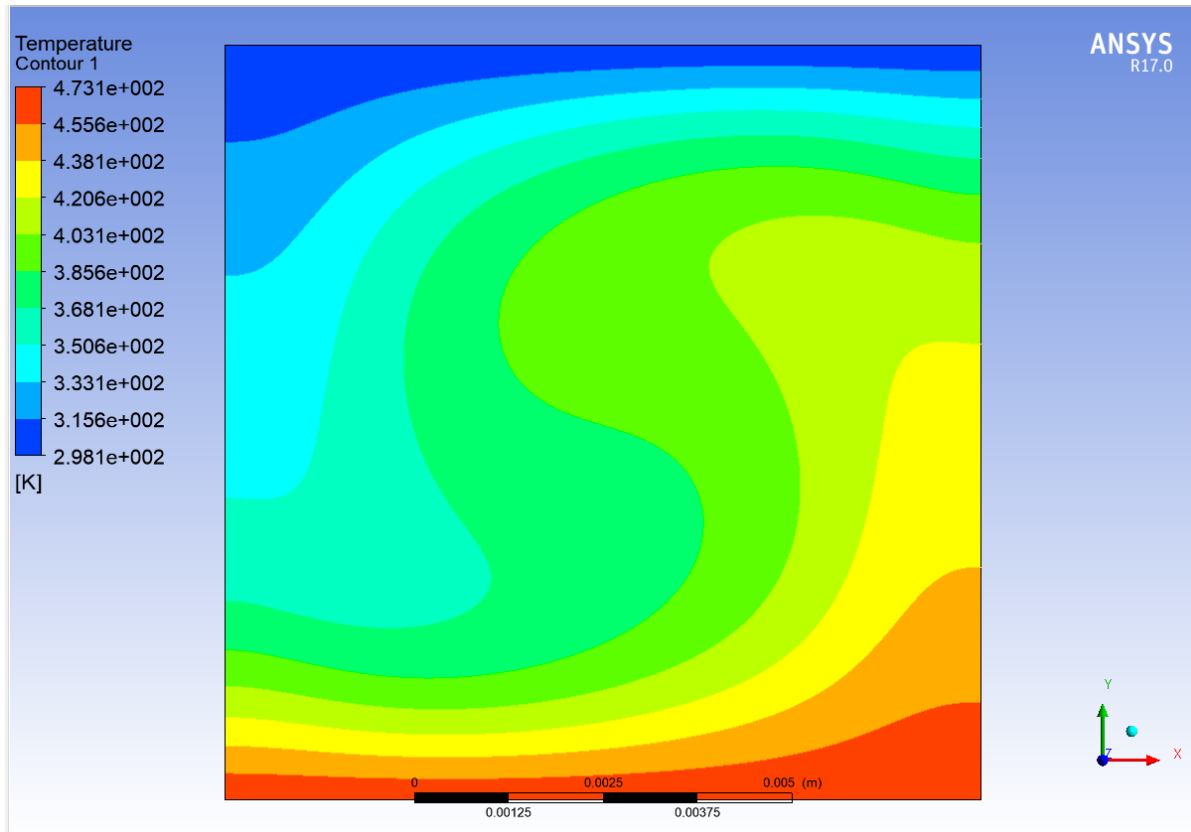
3. <u>Streamline:</u>

<u>Baseline Case</u>:

The streamline flow is in anti-clockwise or clockwise from down to top, which can be seen in the figure below because the heat transfer is from bottom to top, as the temperature at the bottom is higher than the temperature at the top.