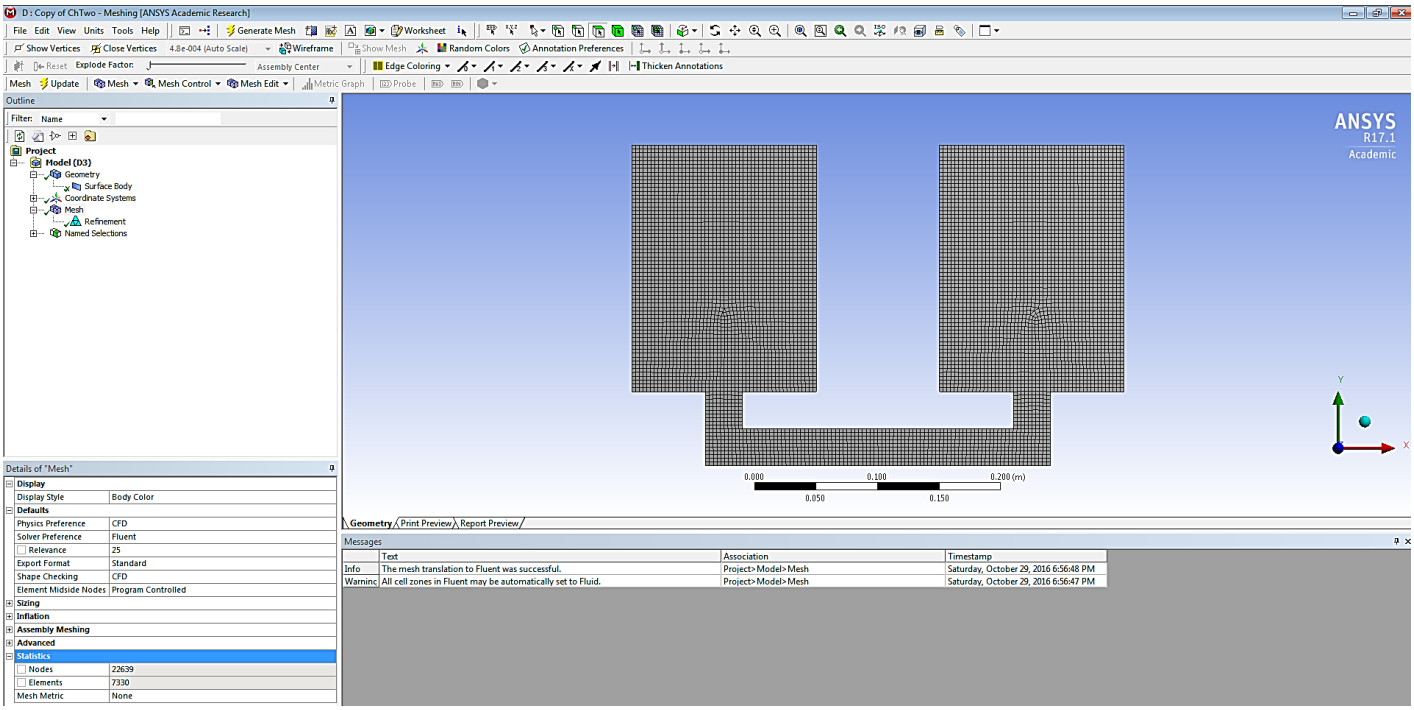
Steven Gomez
MAE 494

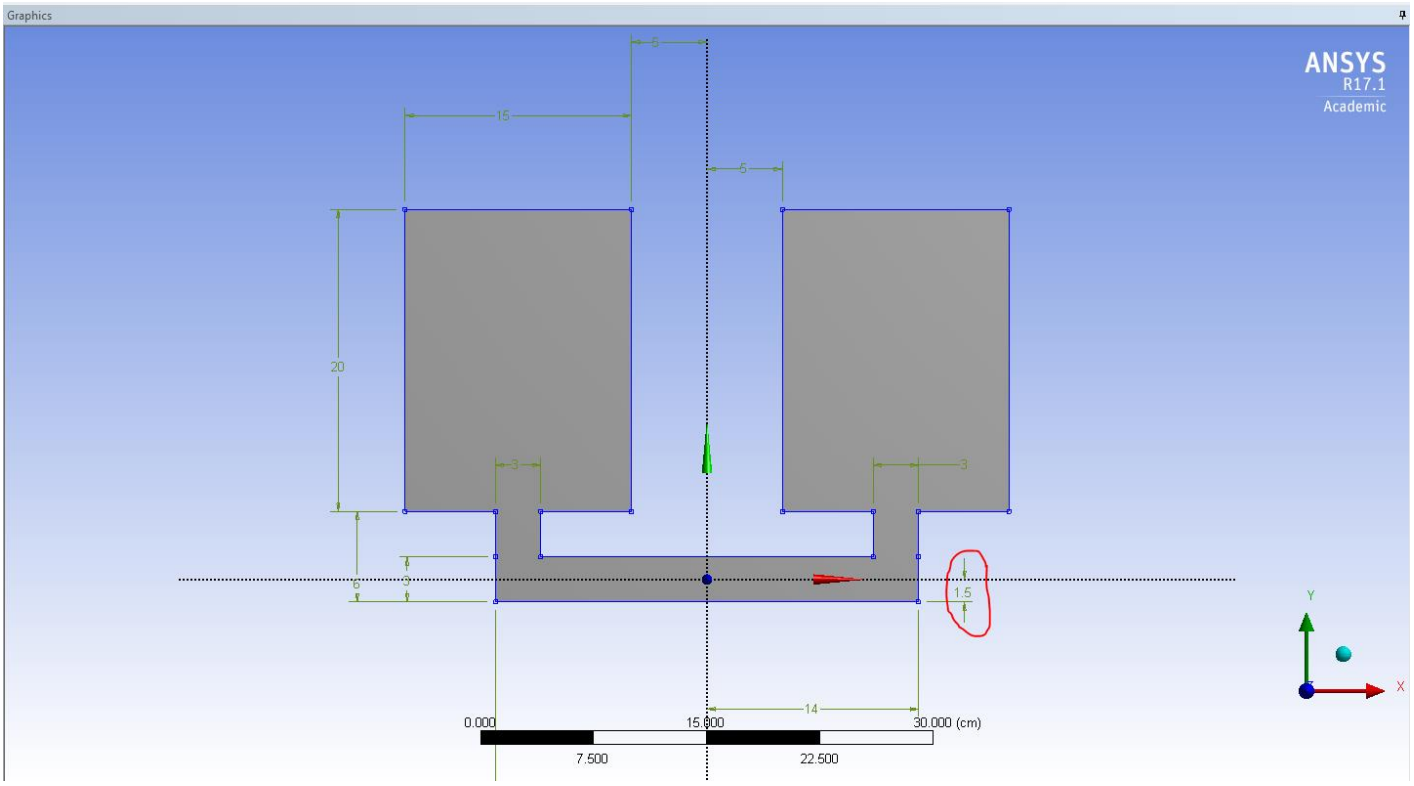
Part III

Challenge #4

Mesh details:



Geometry details:*Special note: geometry base is 1.5cm below x-axis*



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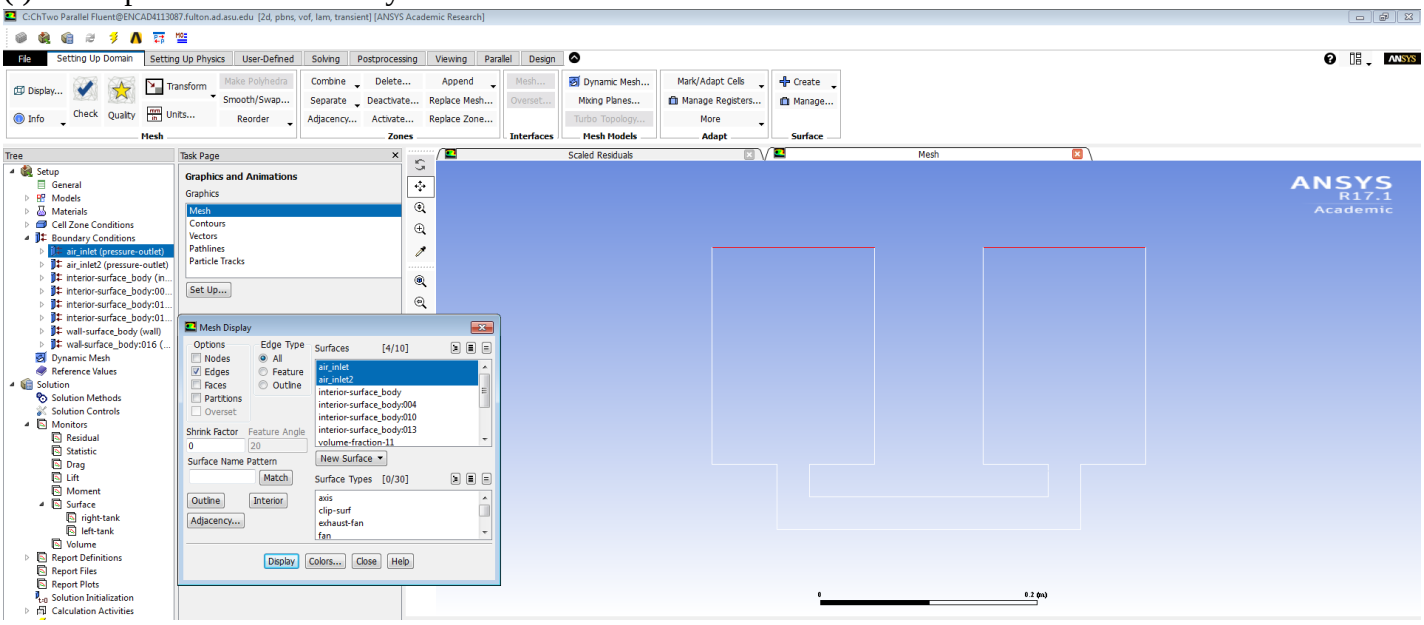
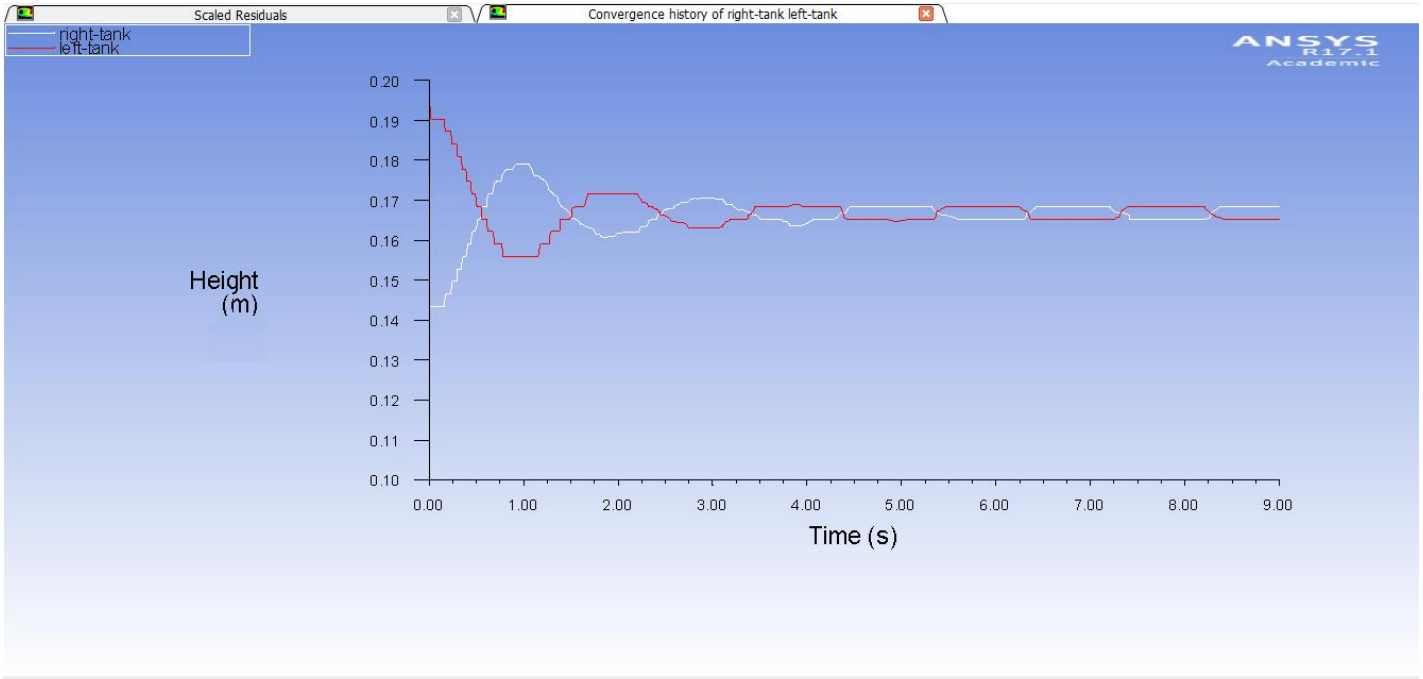
(a) Viscous-laminar model: (i), (ii), (iii), (iv)

(i) Description of the boundary conditions: used *Pressure Outlet* for both boundaries-

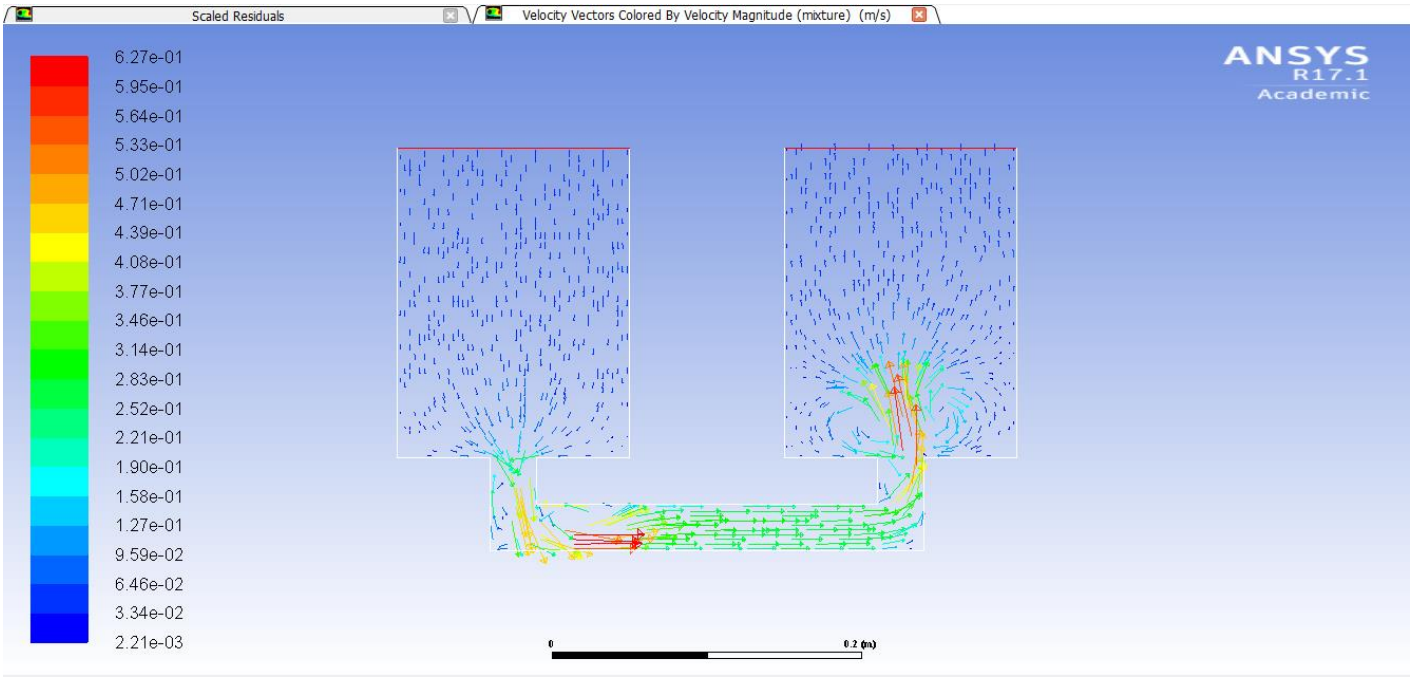


(ii) Line plot of the water levels as a function of time. $t_1 = 0.552s$ & $t_2 = 1.52s$

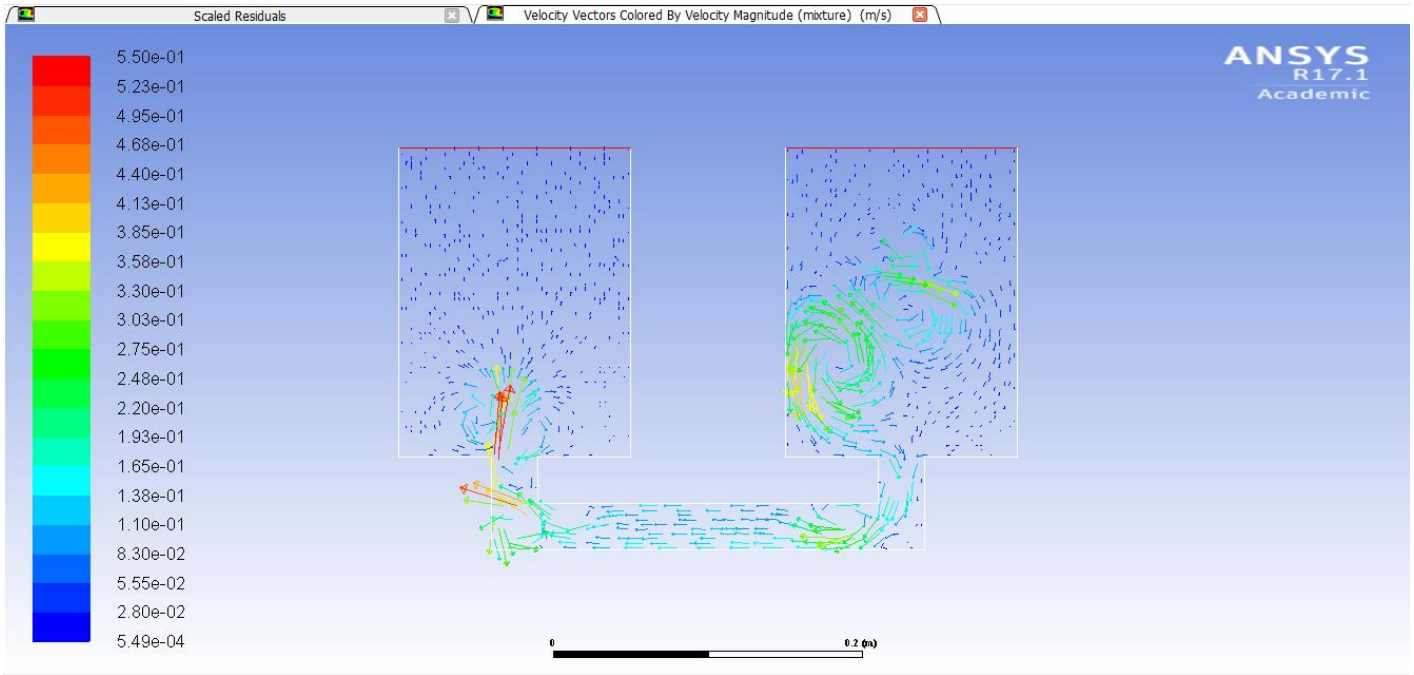


(iii) Plots of velocity vector field

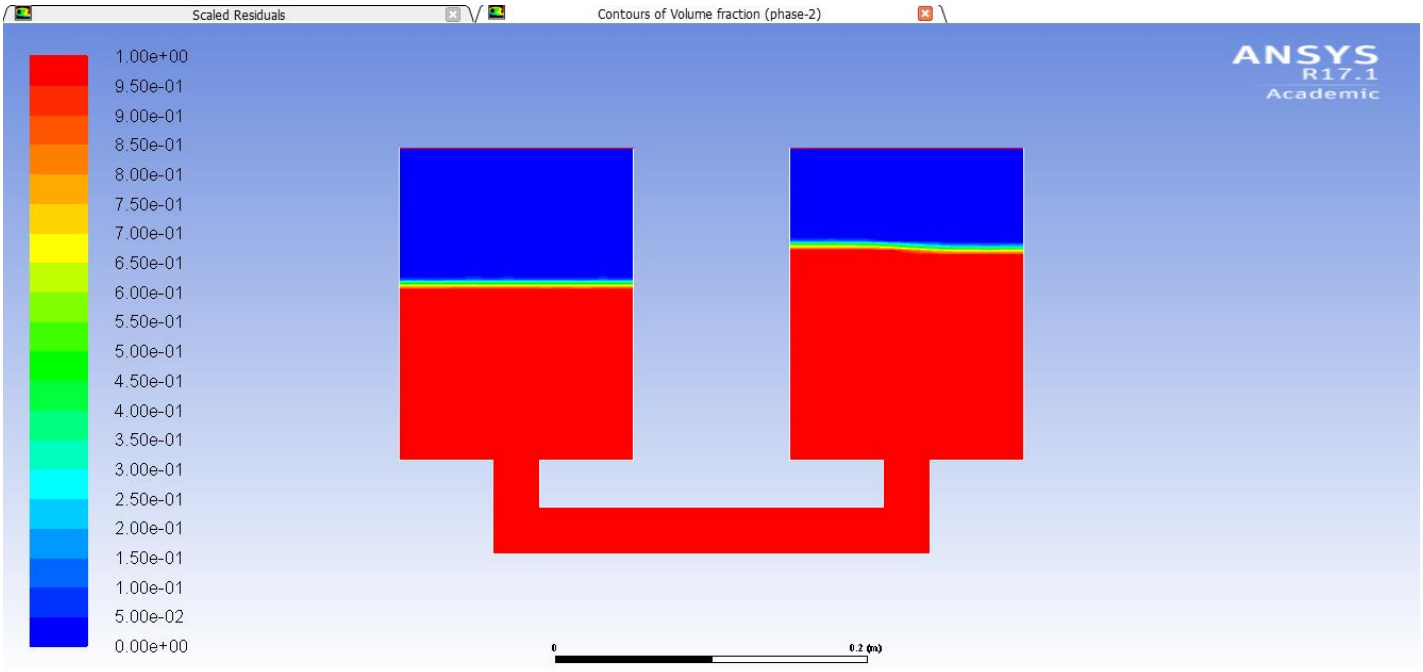
$t_1 = 0.552s$:



$t_2 = 1.52s$:

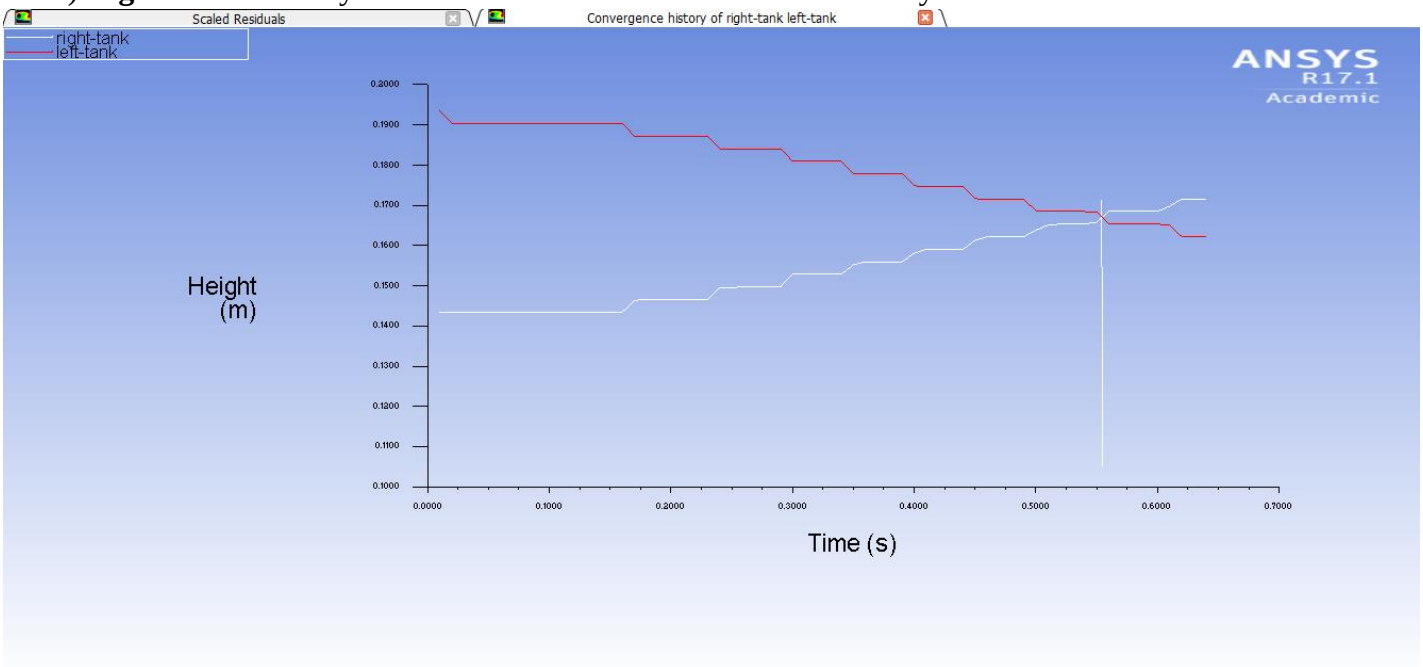


(iv) Contour plot of the volume fraction of water (phase 2) at half cycle of oscillation form initial time:



(b) Other boundary conditions:

Set 1) **Right** tank boundary condition: *Outlet-vent* & **Left** tank boundary condition: *Outlet-vent*



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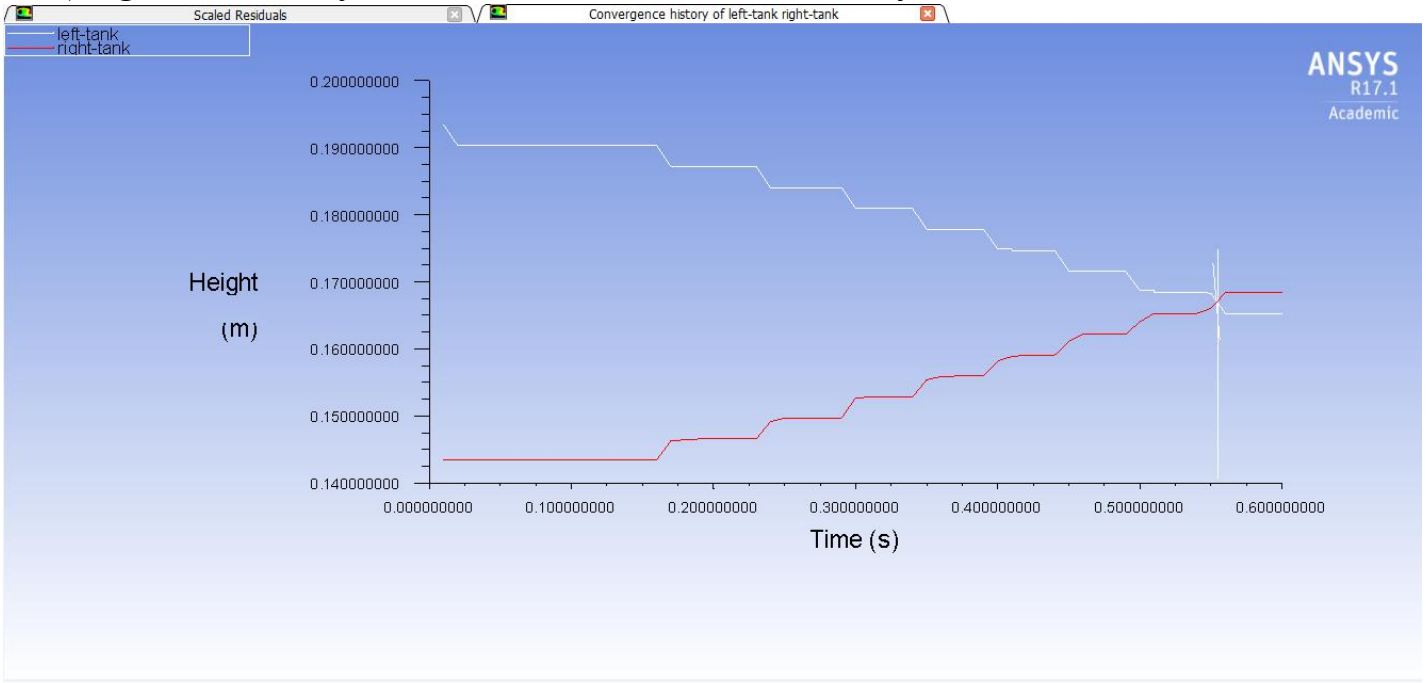
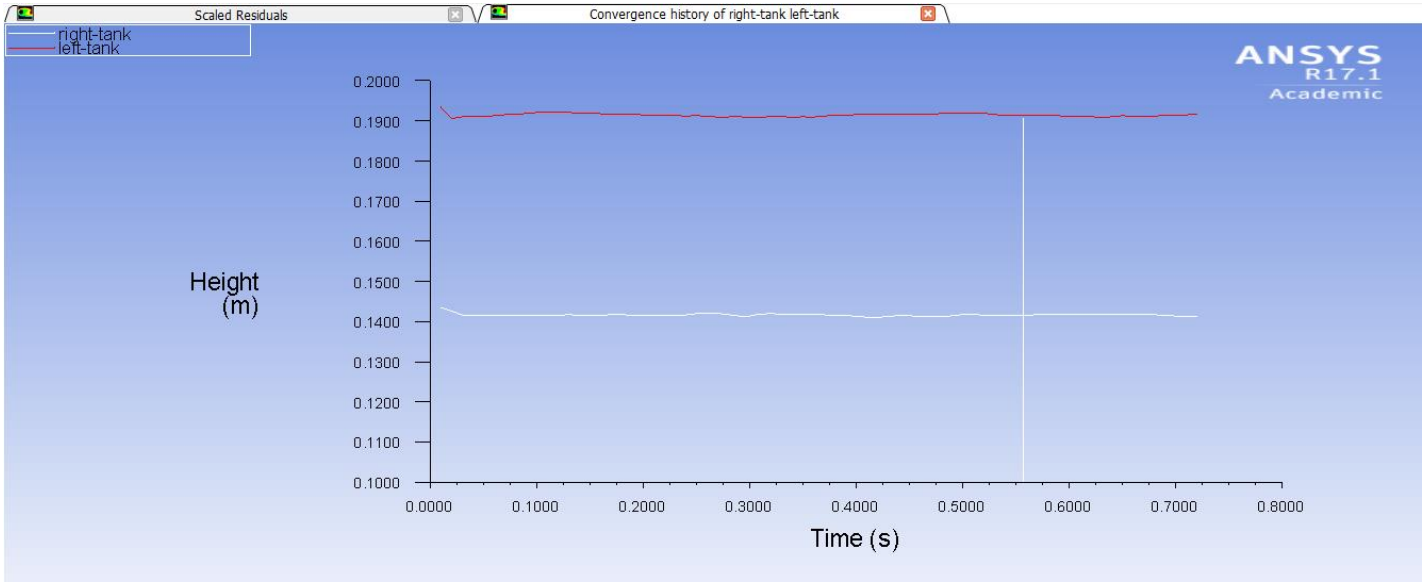
Set 2) **Right** tank boundary condition: *Inlet-vent* & **Left** tank boundary condition: *Inlet-vent*



Set 3) **Right** tank boundary condition: *Wall* & **Left** tank boundary condition: *Wall*



The investigation of three boundary conditions at the top openings that affect the solution/simulation are displayed above. As you can see with both of the boundary conditions set to Outlet-vent or Inlet-vent the simulations runs the same as part (a) where the boundary conditions are set to Pressure Outlet. However, once you set the boundary conditions to wall the simulation still runs but different results are obtained as seen above, and for this case the water level does not move with time. Lastly, further investigations was done but not shown due what was requested and the further investigation showed that any combination of Pressure Outlet, Outlet-vent, and Inlet-vent would yield the same results as in part (a).