

PhD course in CFD with OpenSource software, 2009
Assignment 1
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The Assignment includes the following cases

- cavity, cavityClipped, cavityFine, cavityGrade, cavityHighRe
- plateHole
- damBreak, damBreakFine
- cylinder
- pitzDaily
- forwardStep
- decompressionTank, decompressionTankFine
- and hartmann.

cavity

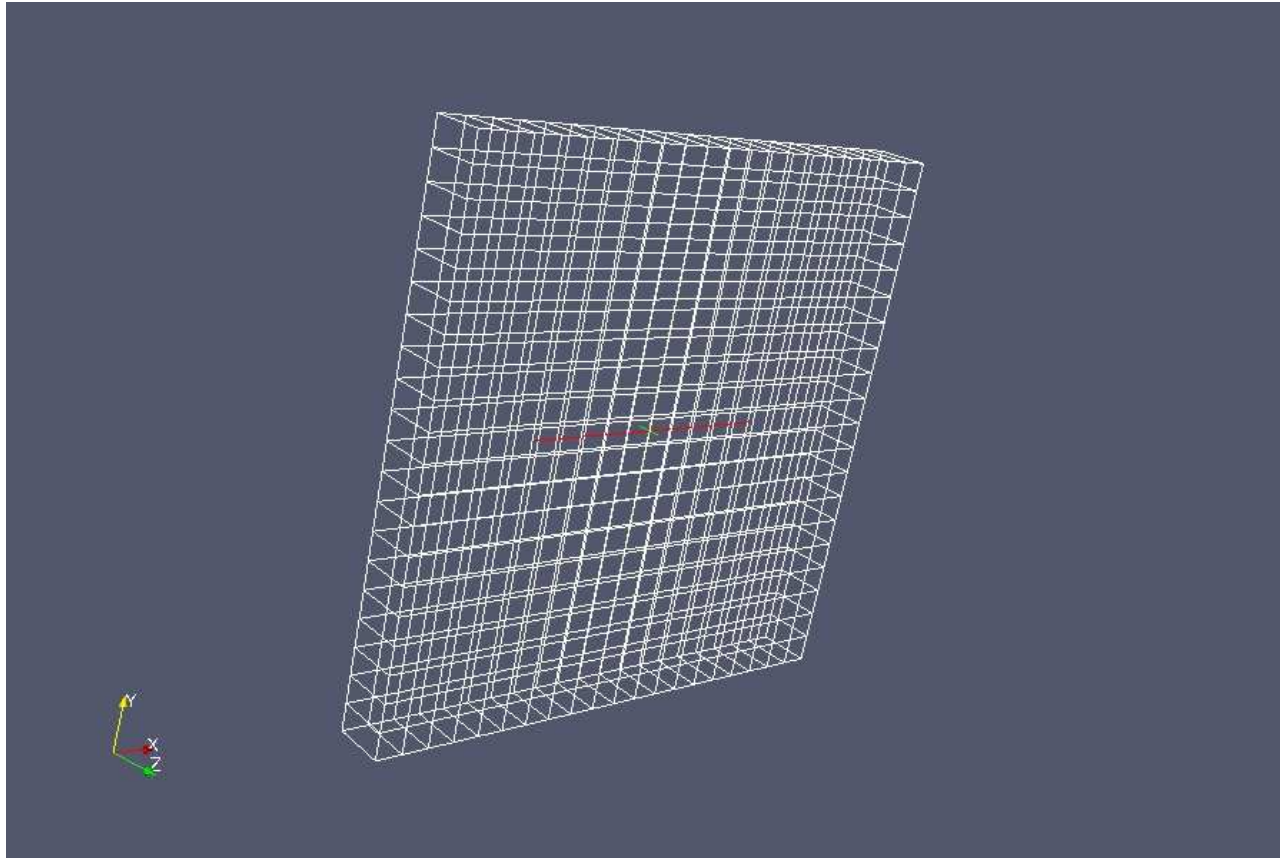


Fig: the Mesh

cavity continued

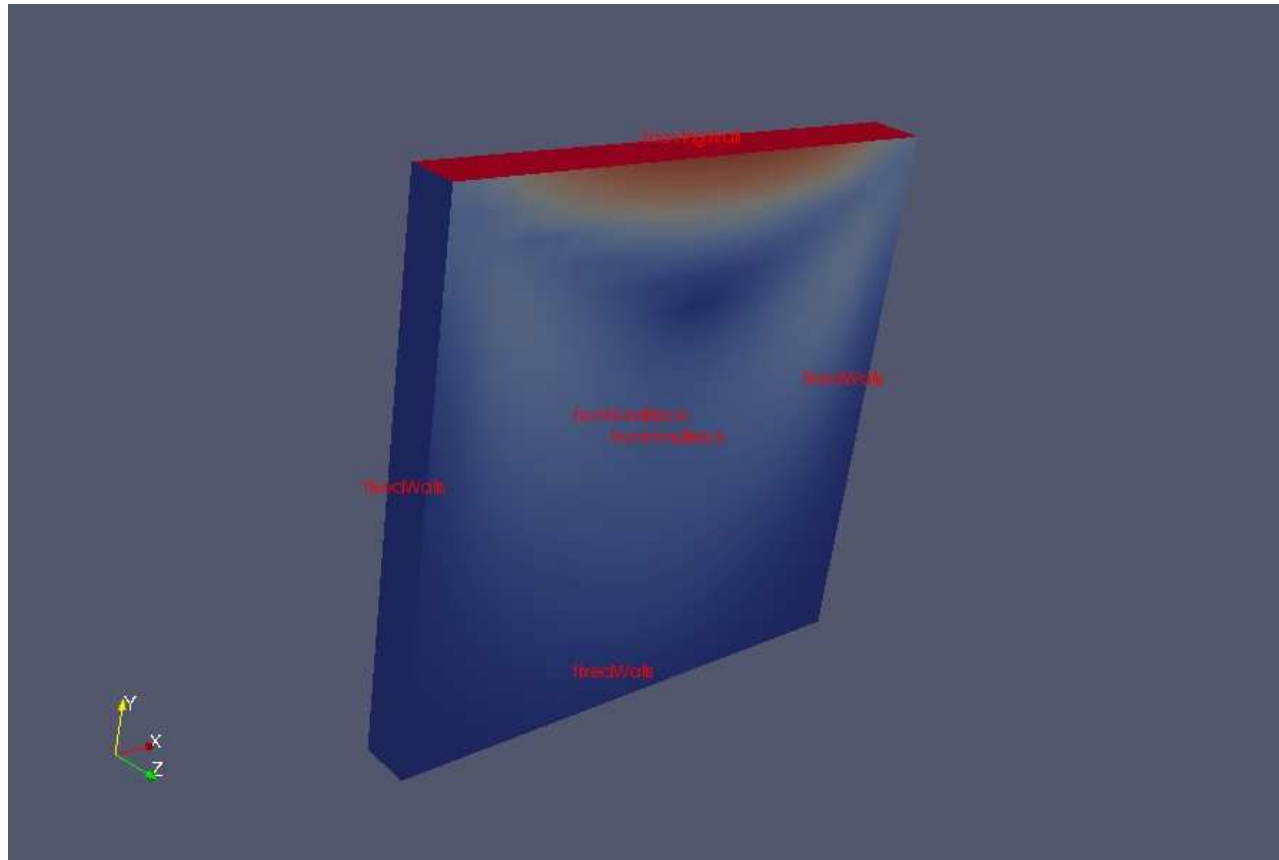


Fig: Velocity profile at time= 0.5s

cavityClipped

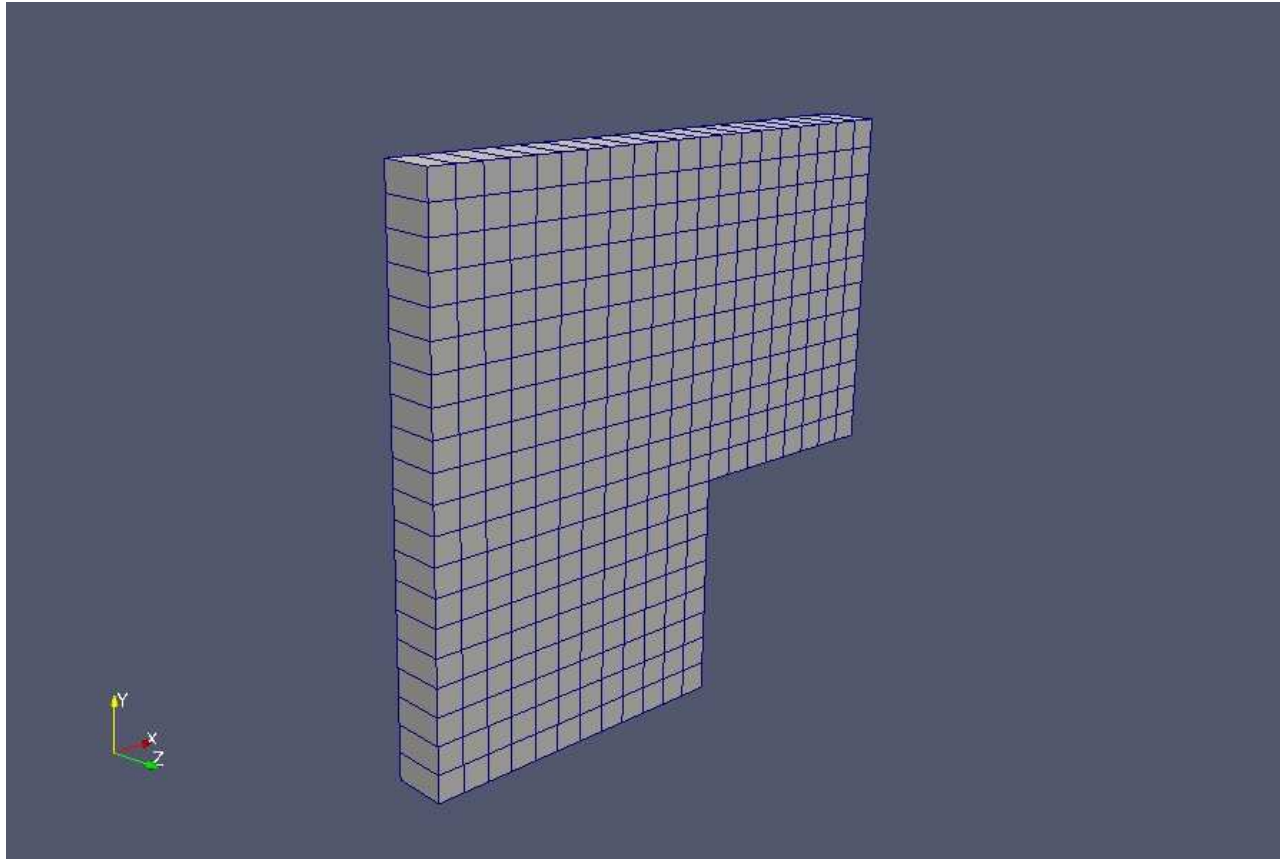


Fig: the Mesh

cavityClipped

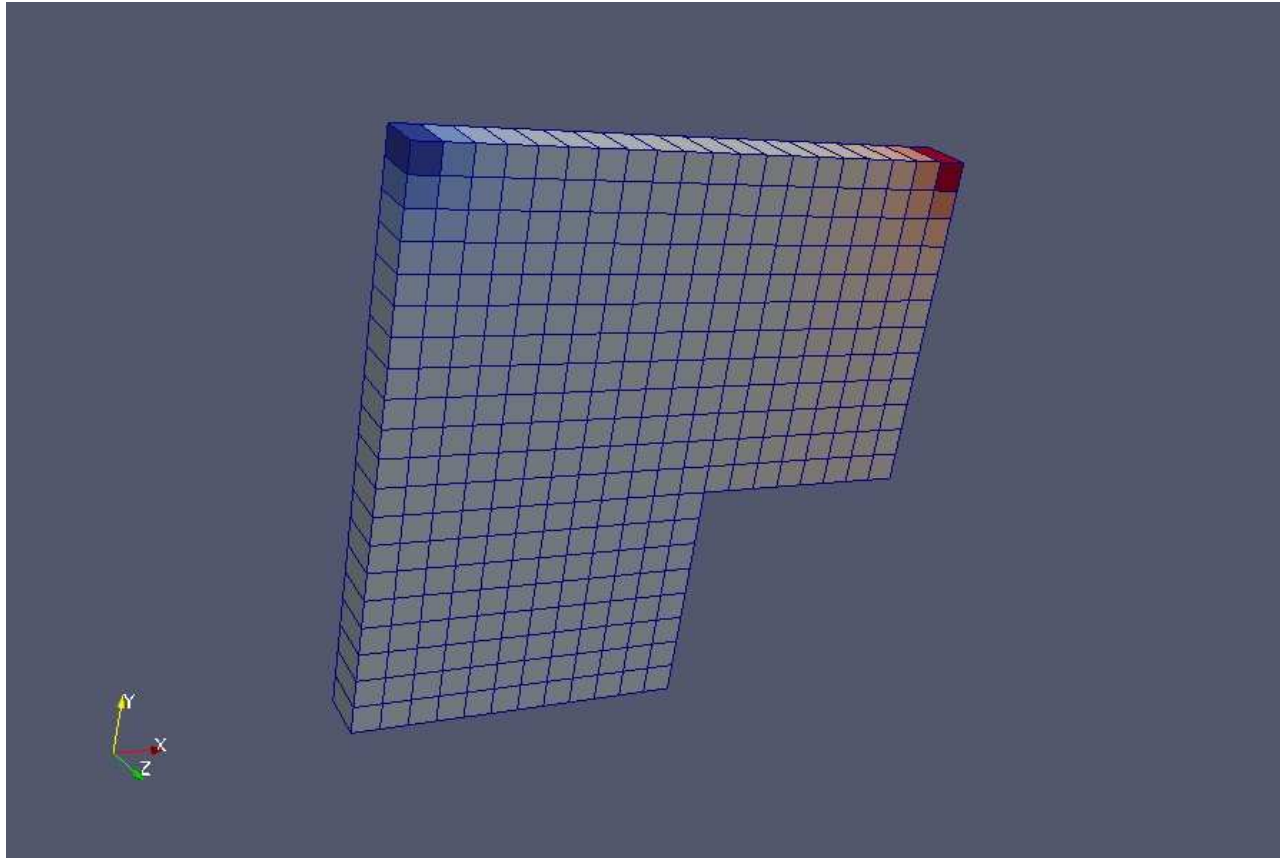


Fig: cell based pressure at time= 0.6s

cavityFine

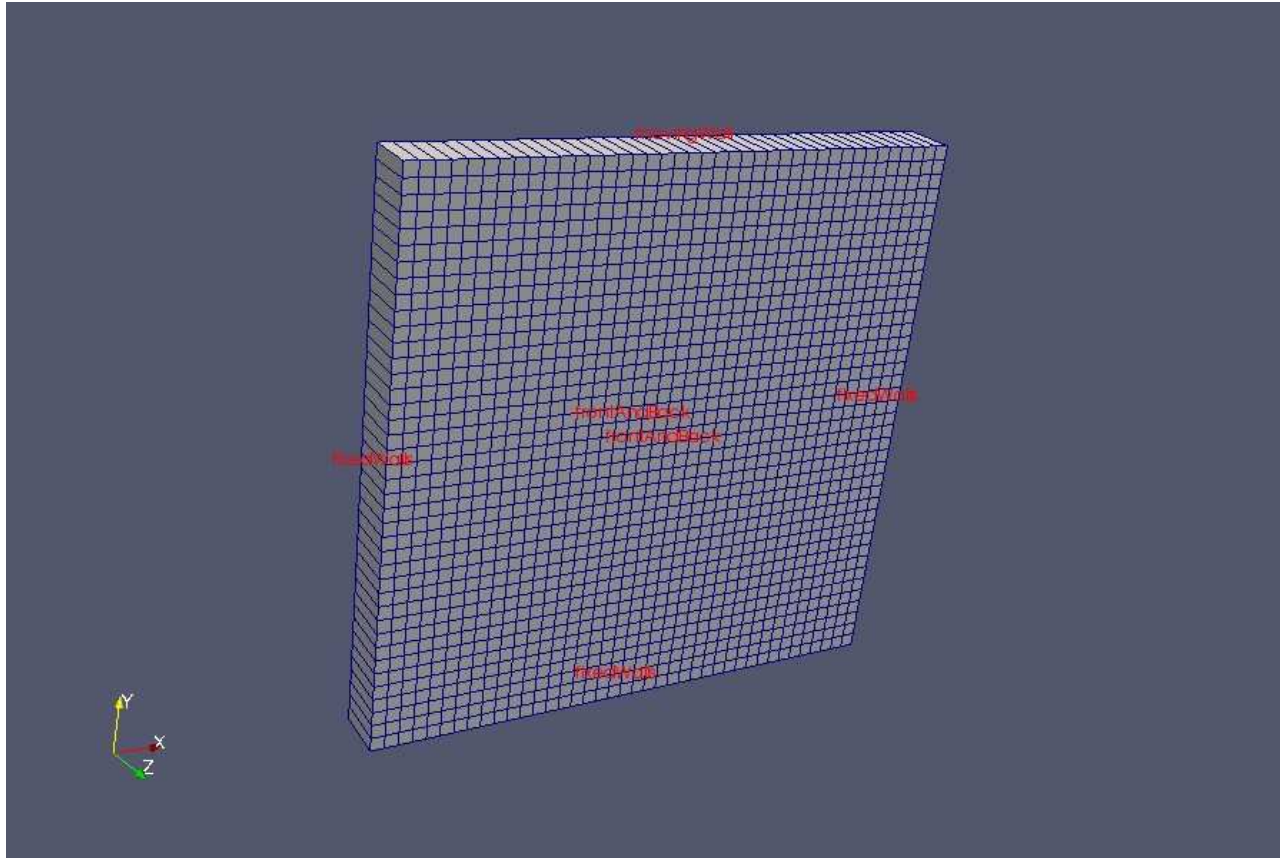


Fig: the Mesh

cavityFine continued

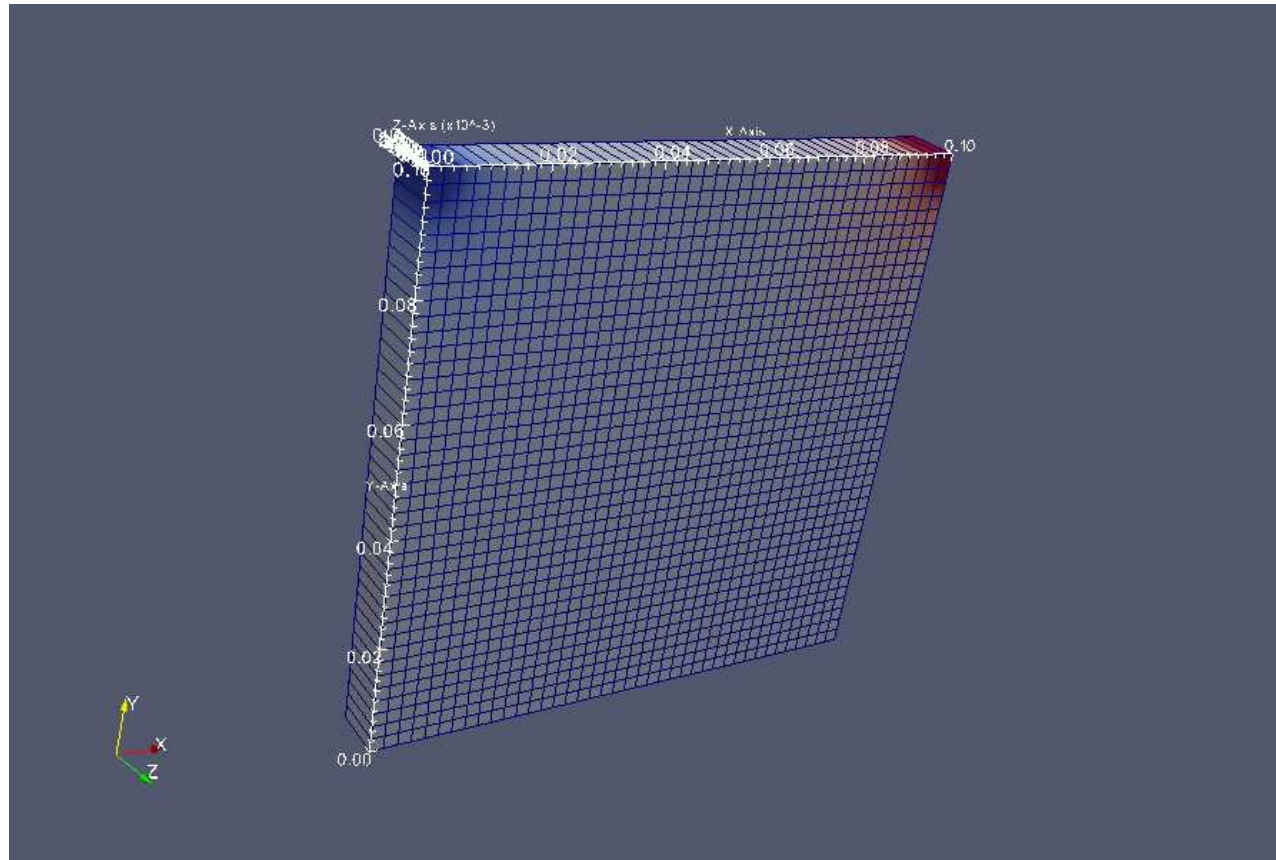


Fig: cell based pressure at time= 0.7s

cavityGrade

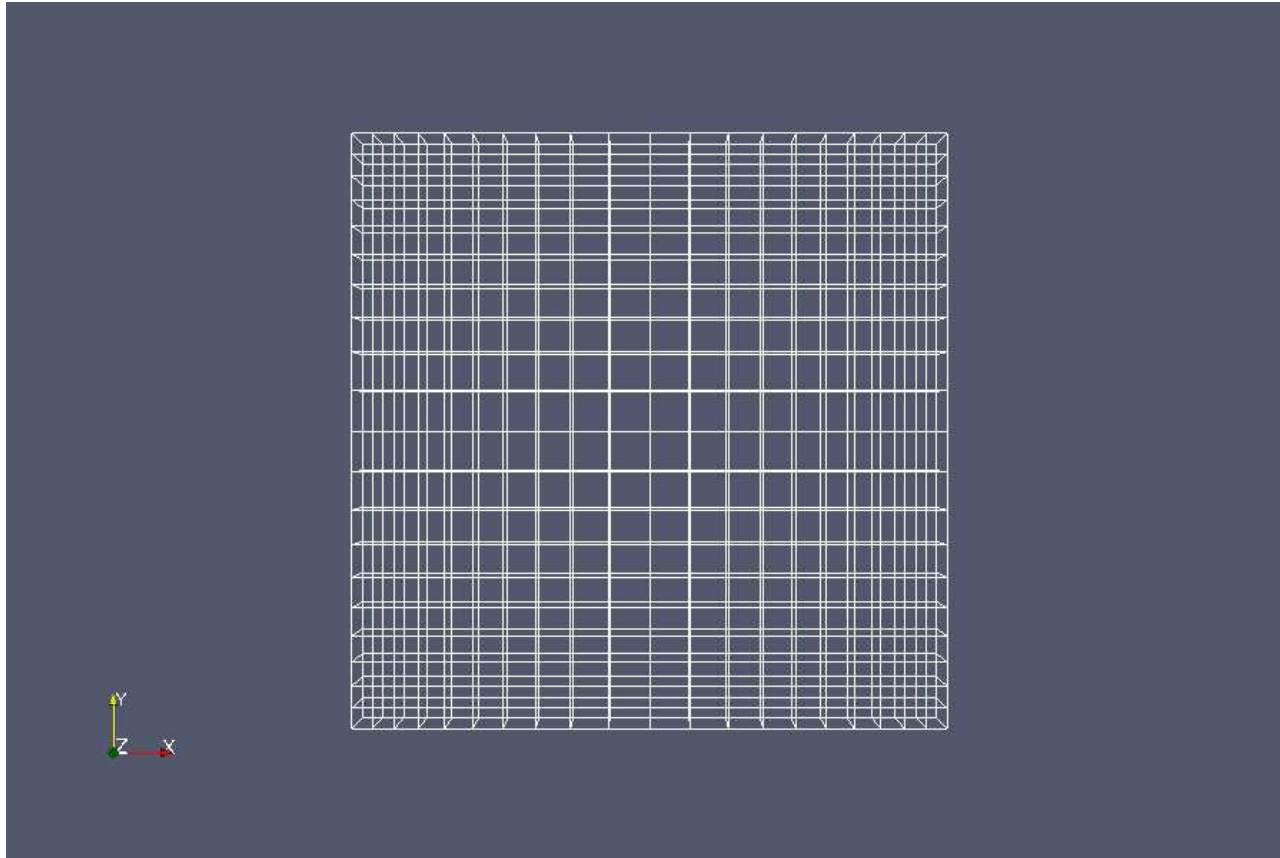


Fig: the Mesh

cavityGrade continued

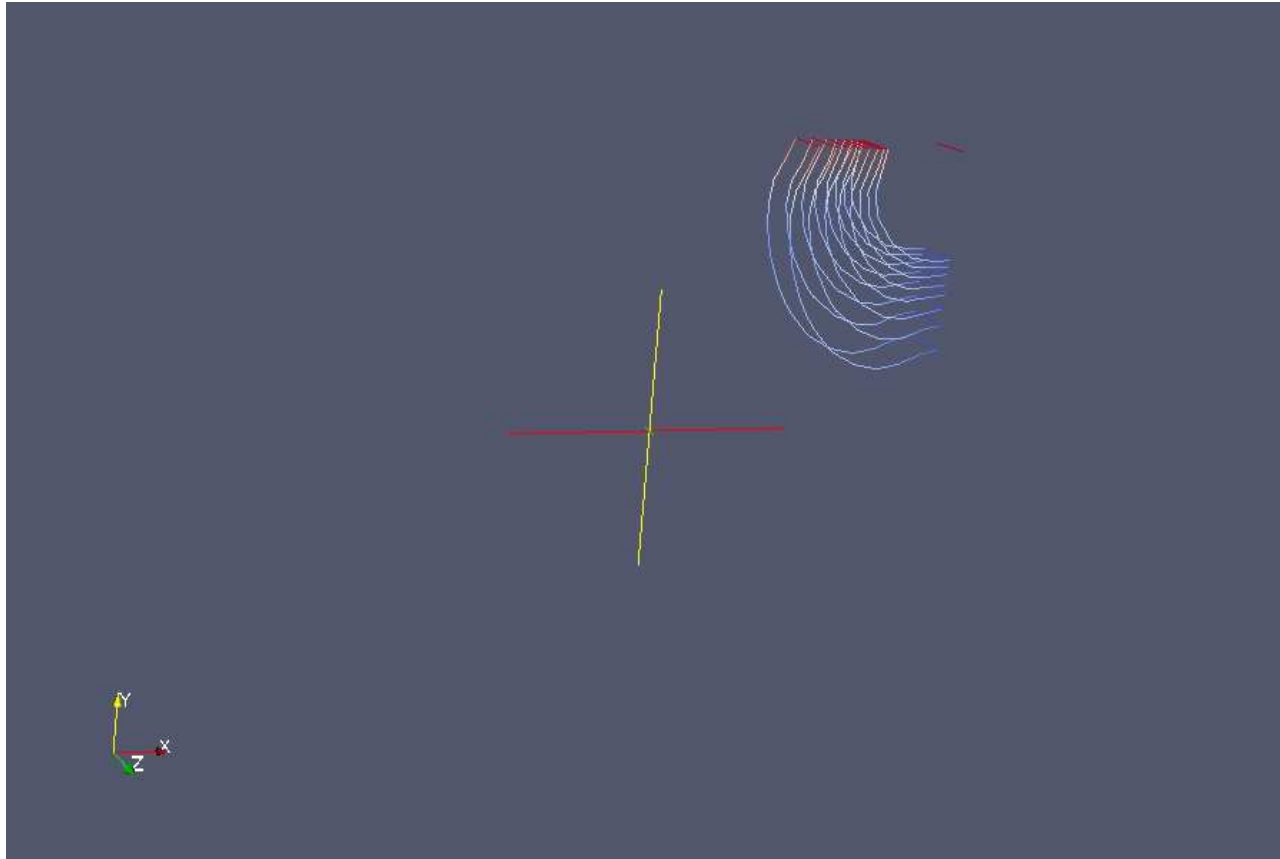


Fig: Velocity contours shown at time= 0.5s

cavityHighRe

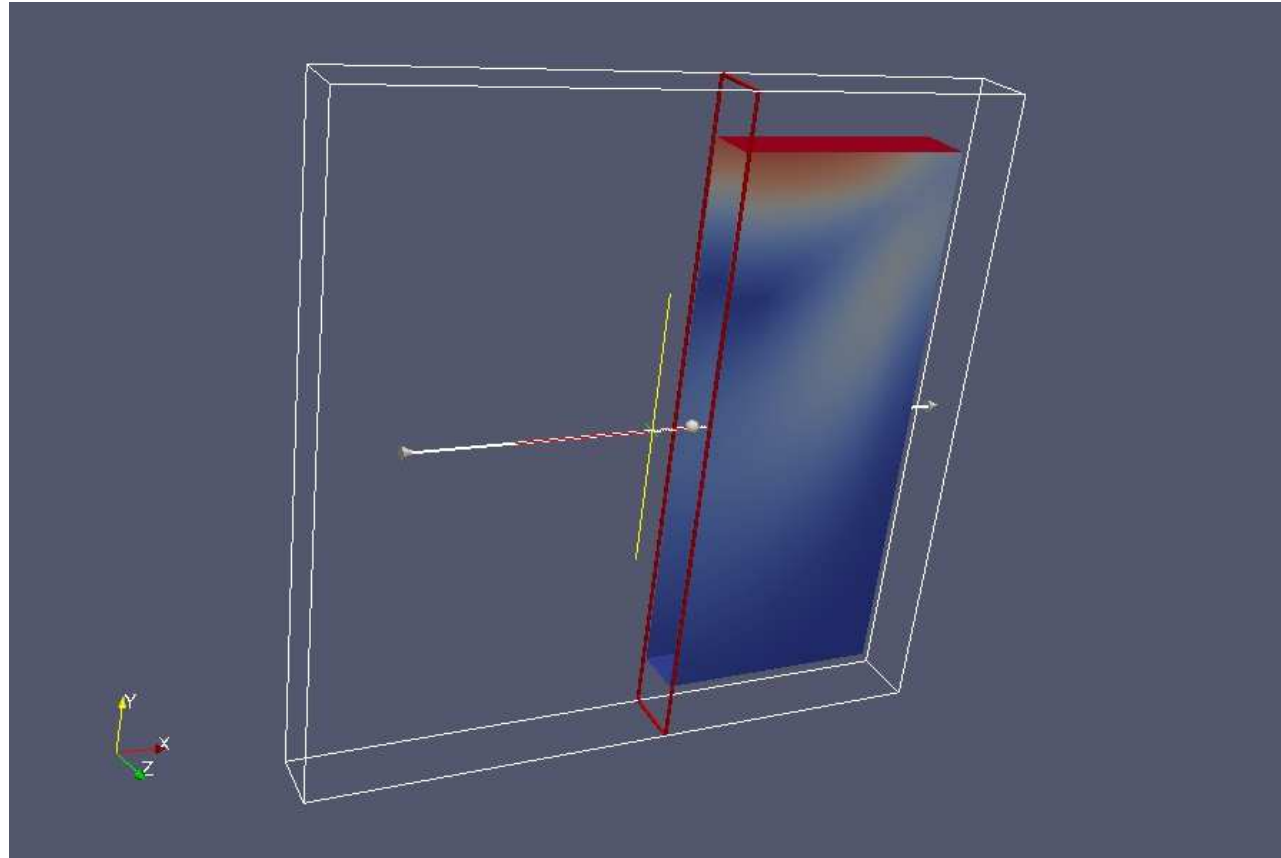


Fig: Velocity distribution clipped at plane, time= 0.5s

plateHole

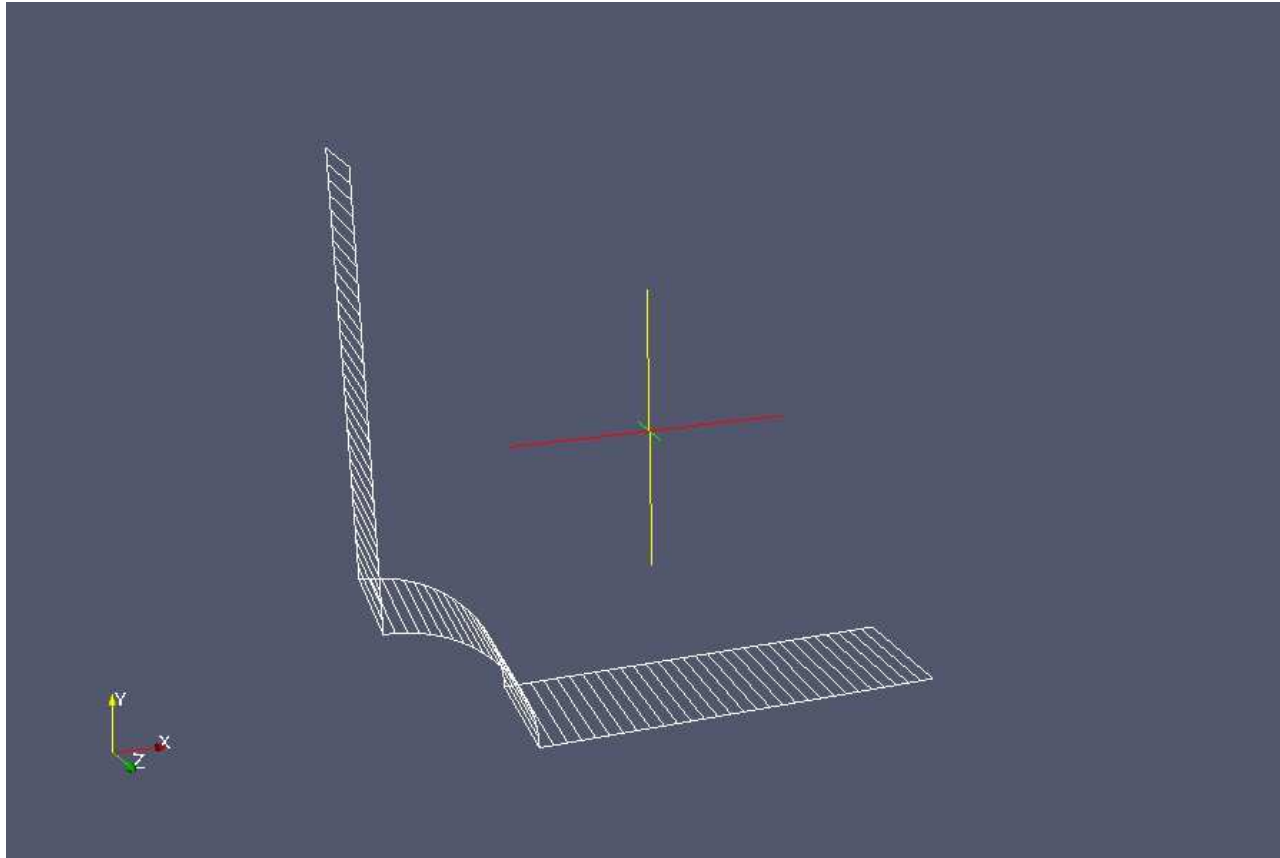
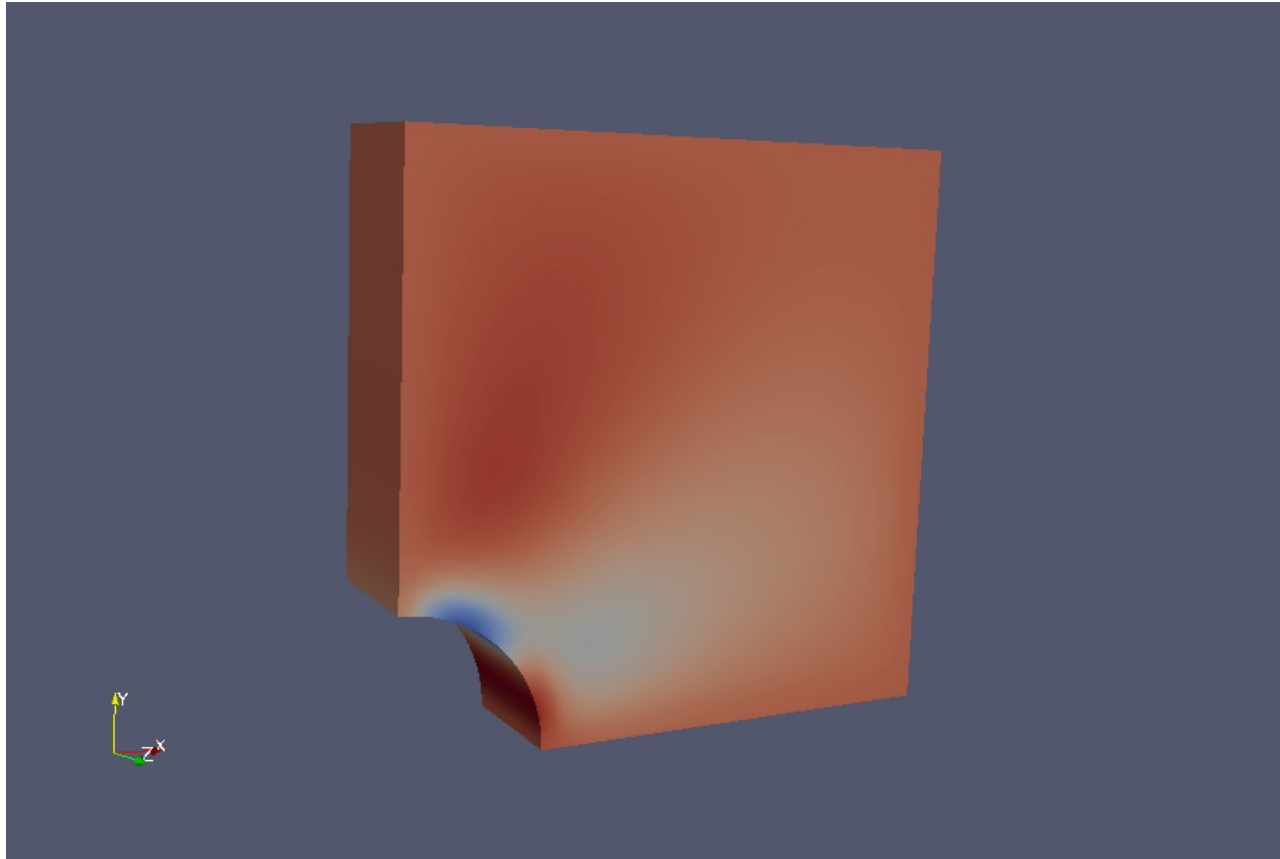


Fig: the Mesh at some selective patches

plateHole continued

Fig: σ_{max} distribution at time= 100

damBreak

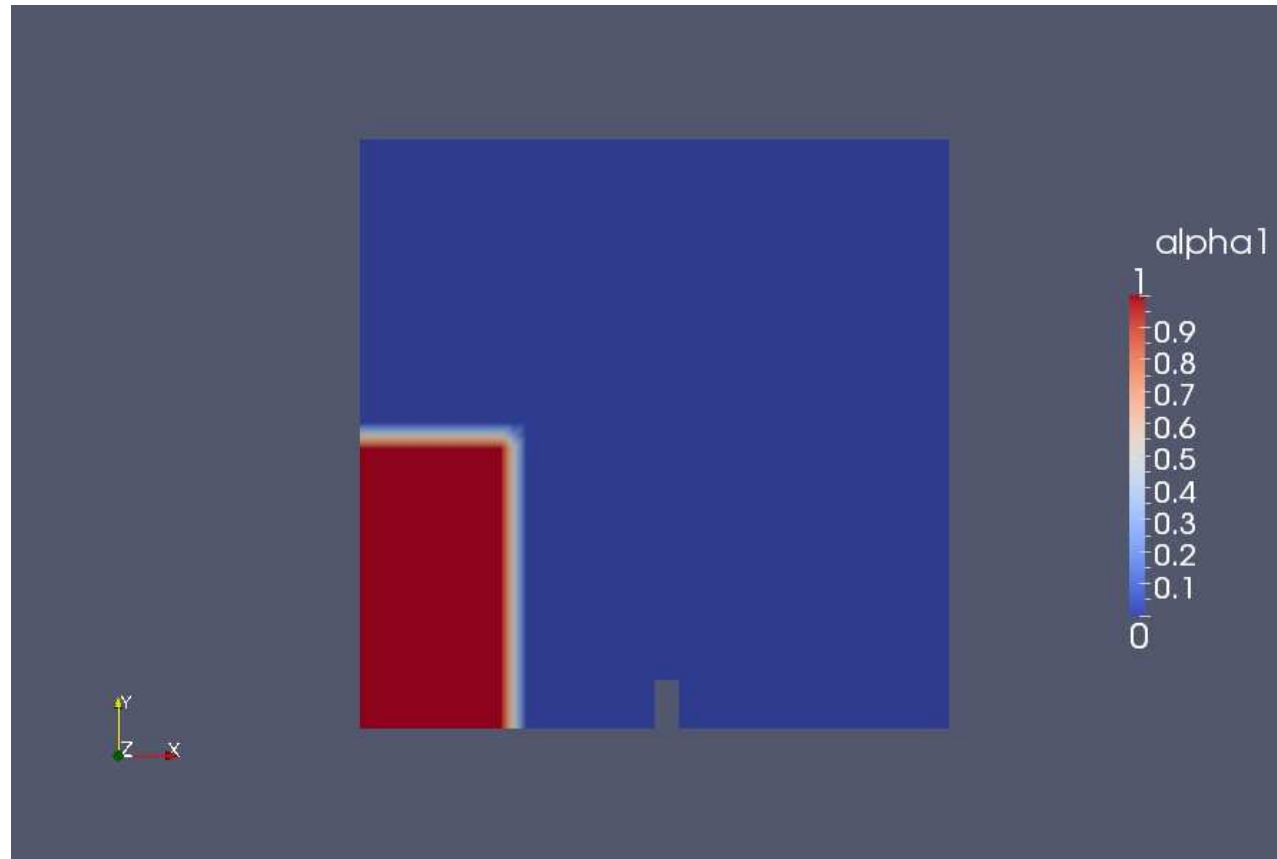


Fig: alpha1 profile at initial condition

damBreak continued

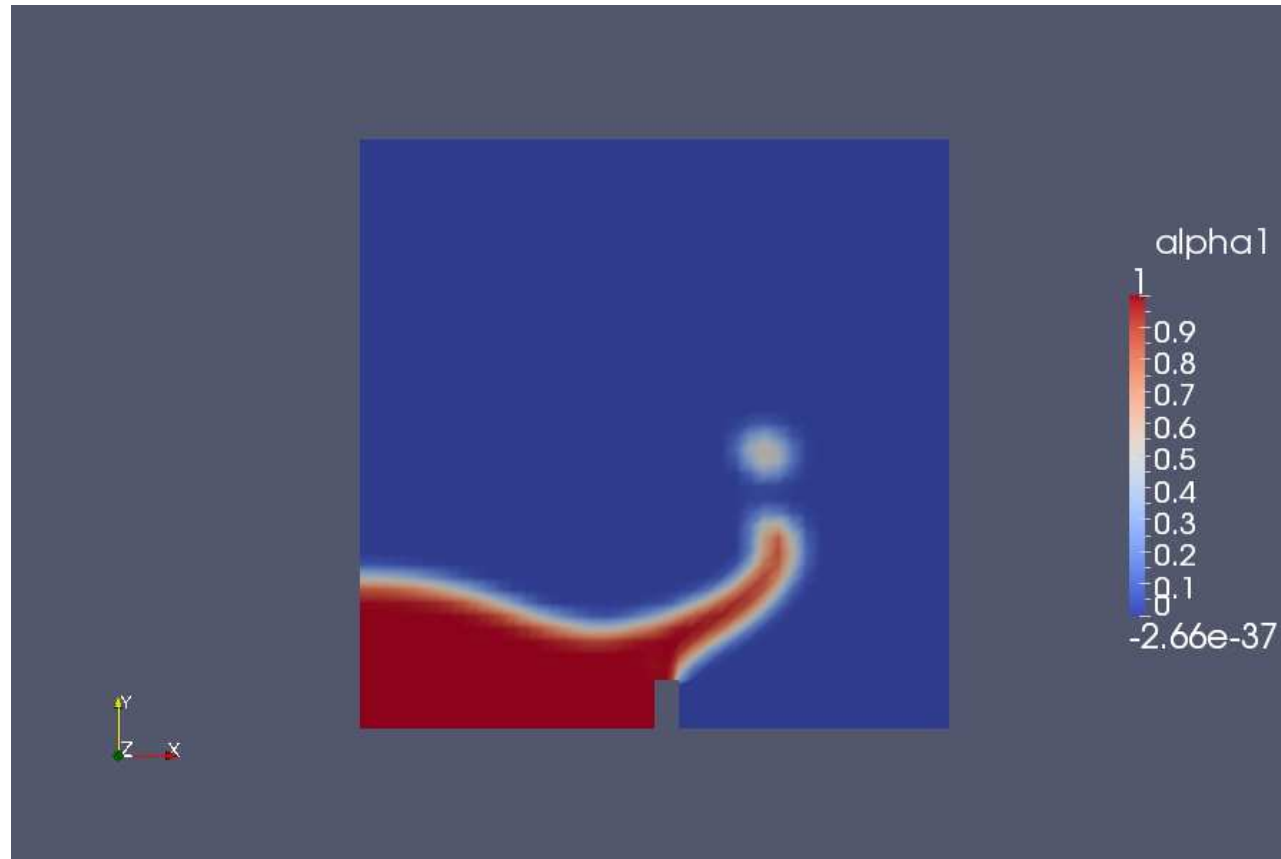


Fig: alpha1 profile at time= 0.25s

damBreak continued



Fig: alpha1 profile at time= 0.5s

damBreakFine

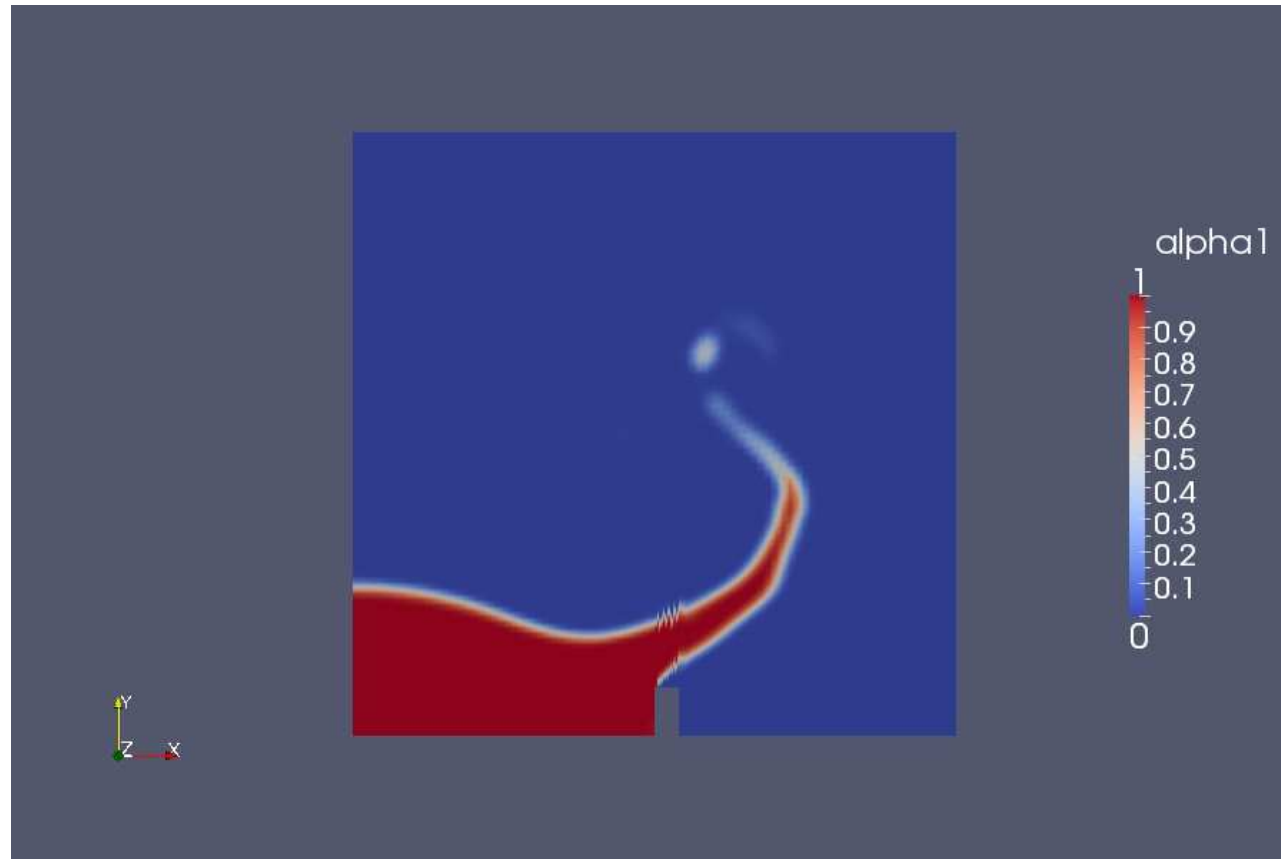


Fig: alpha1 profile at time= 0.25s

damBreakFine continued



Fig: alpha1 profile at time= 0.5s

cylinder

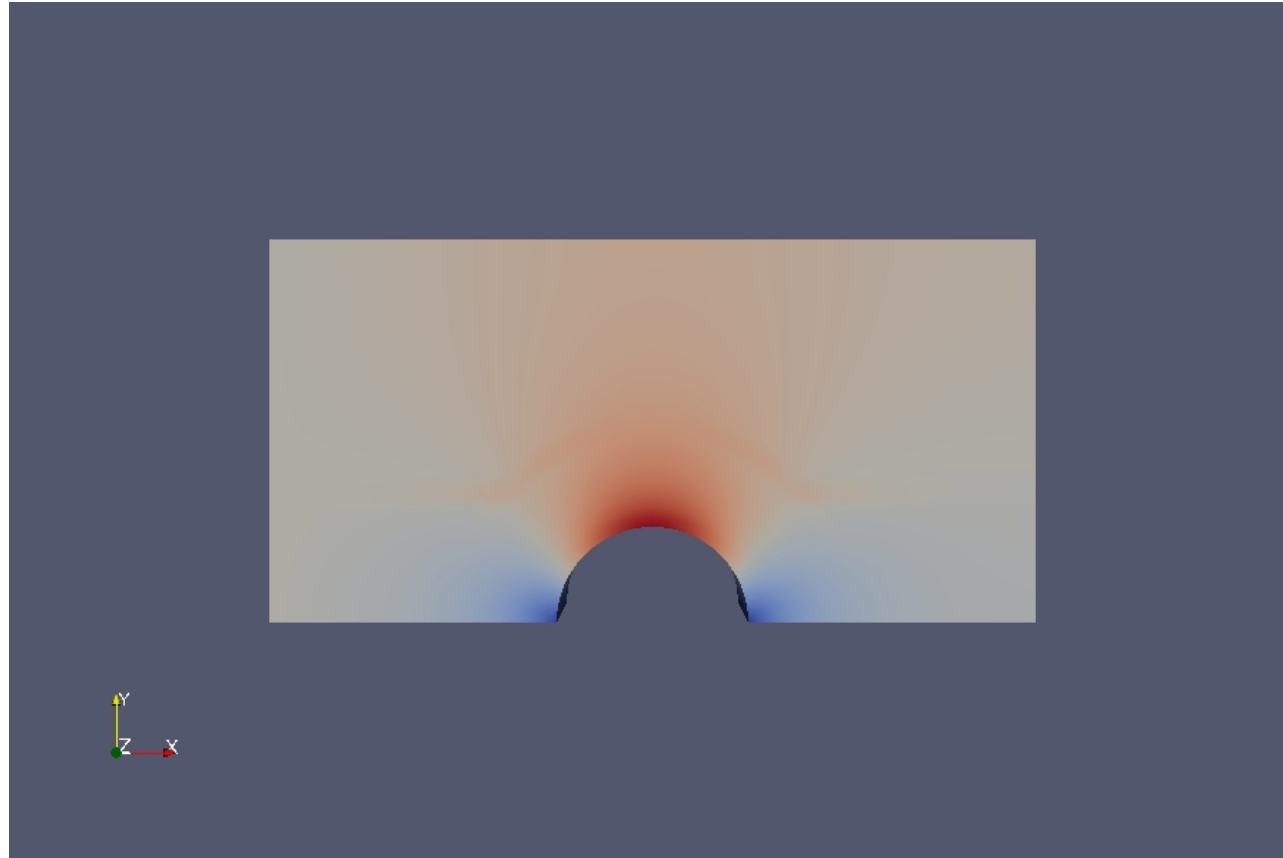


Fig: the analytical solution

cylinder continued

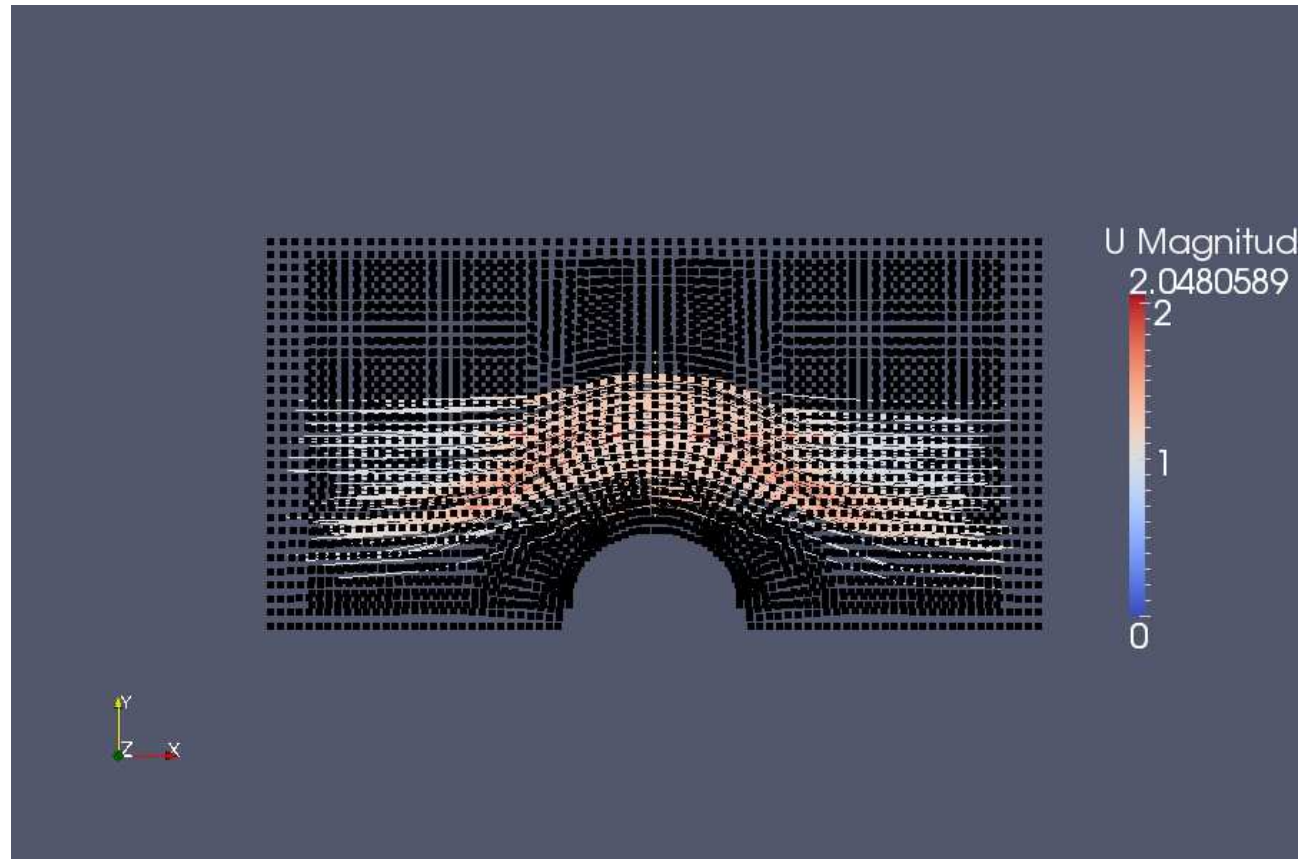


Fig: stream tracing with `nNonOrthogonalCorrectors= 0`

cylinder continued

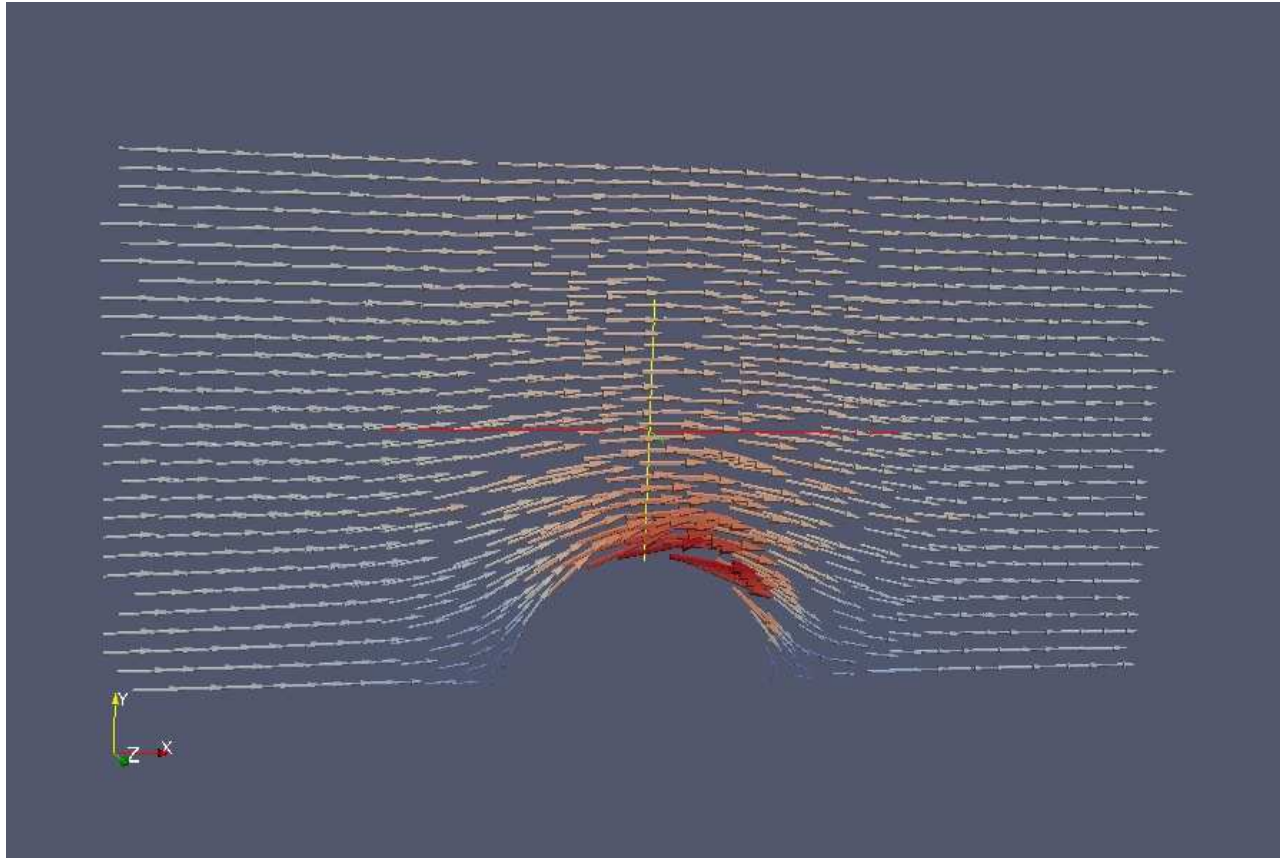


Fig: velocity glyph with `nNonOrthogonalCorrectors= 3`

pitzDaily

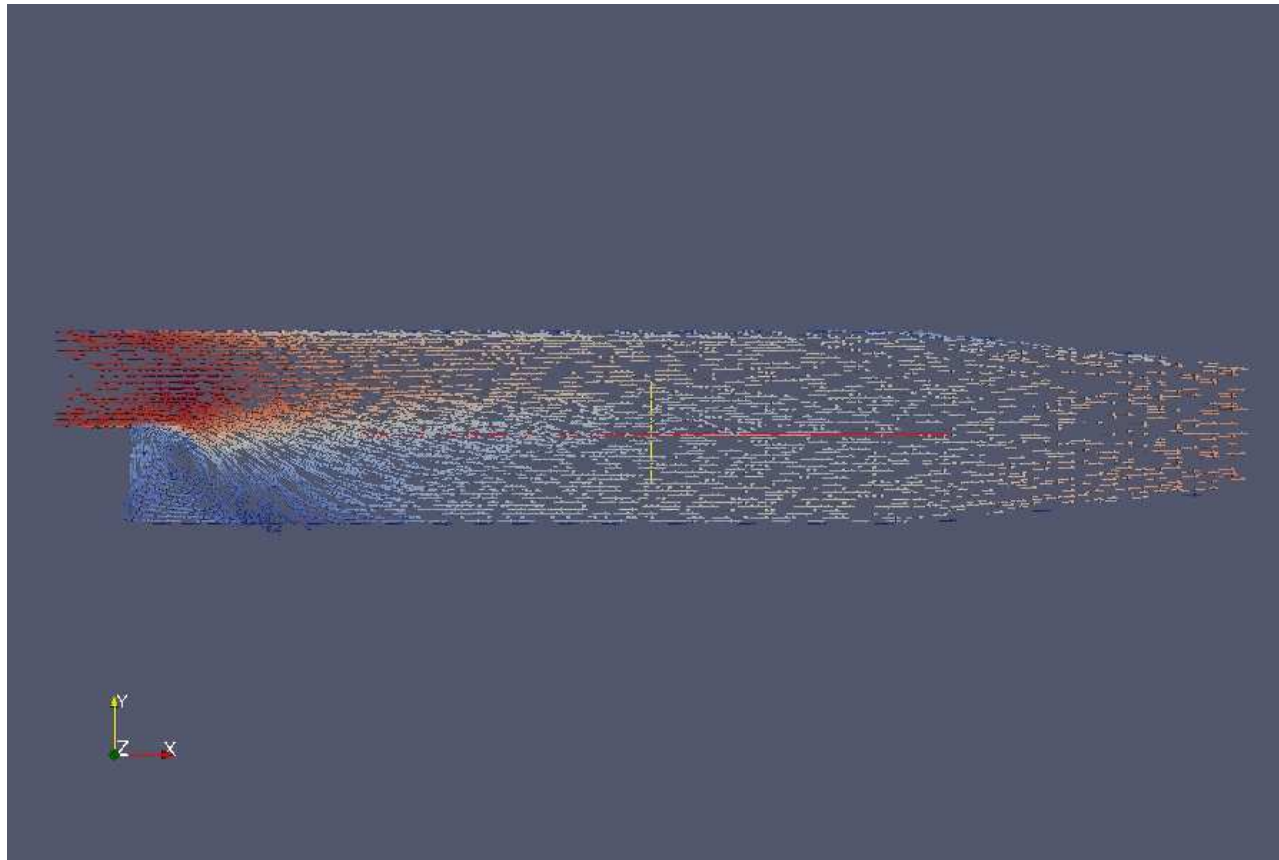


Fig: veocity glyph at, time= 50

pitzDaily continued

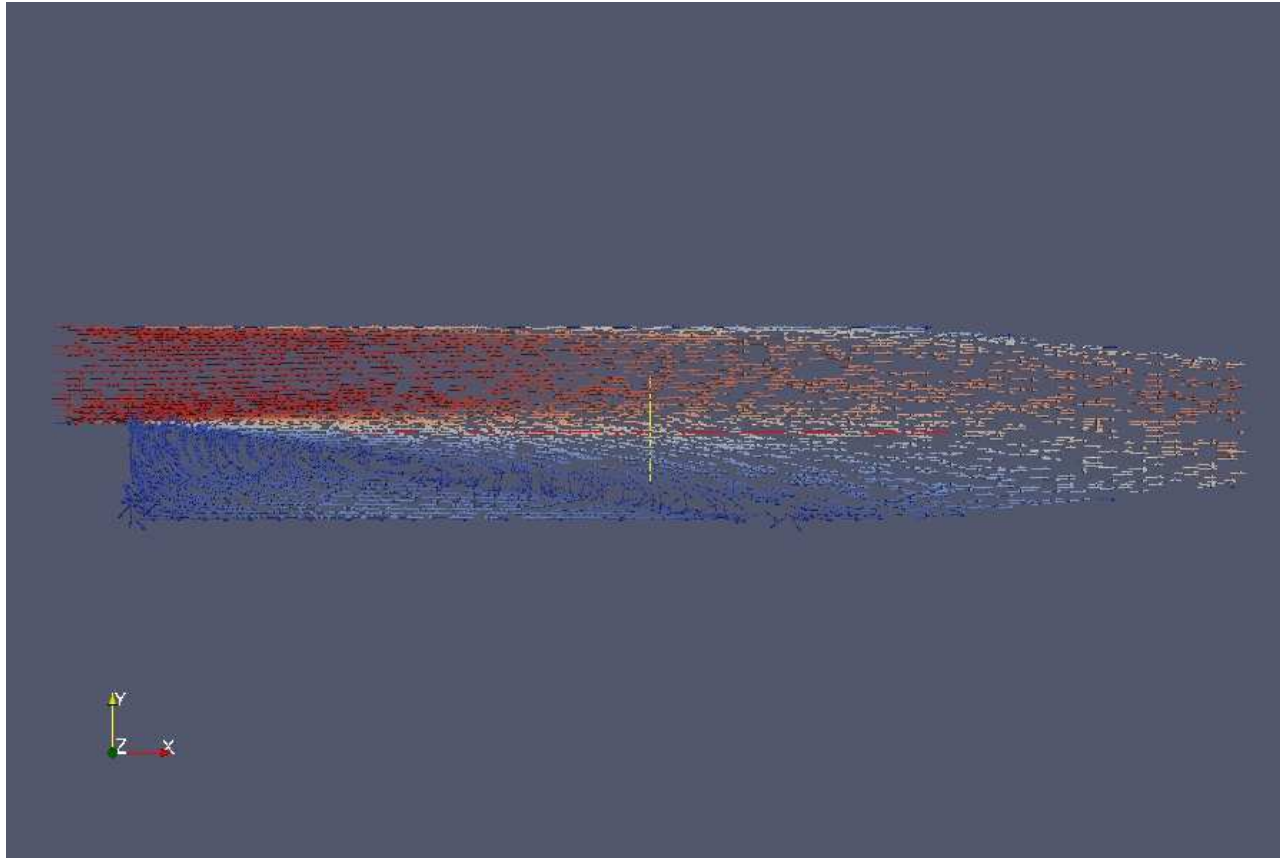


Fig: velocity glyph at time= 1000, having reached steady state

forwardStep

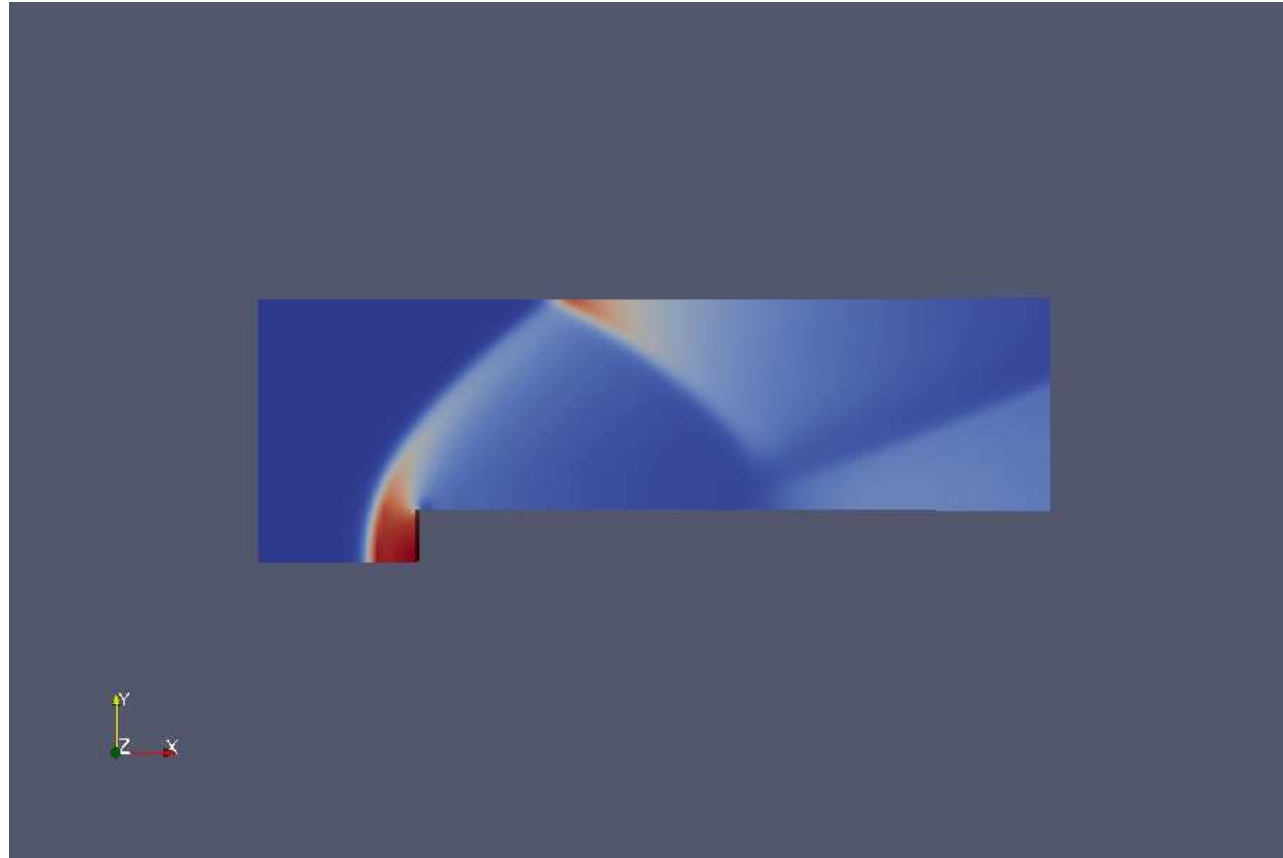


Fig: pressure distribution at time= 10

decompressionTank

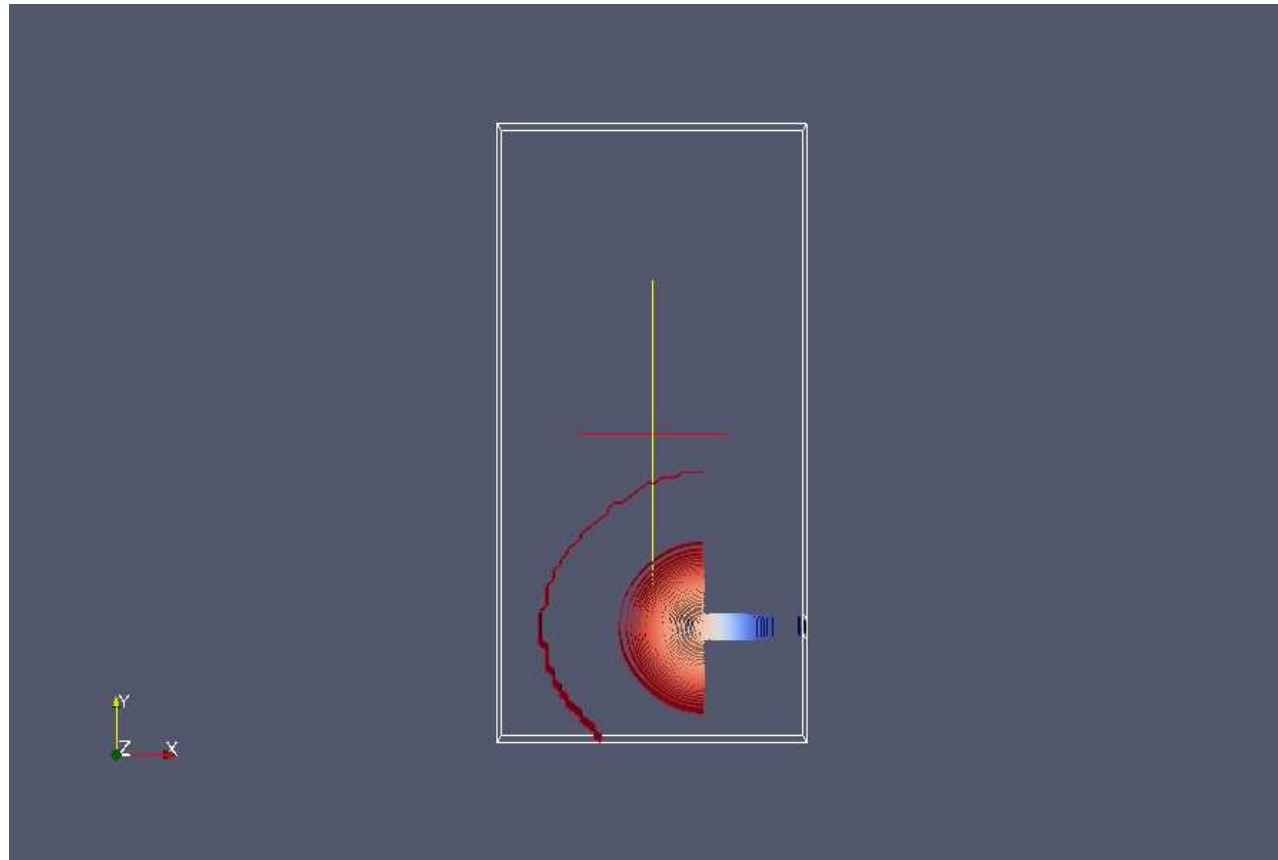


Fig: pressure contours at time= 5

decompression Tank continued

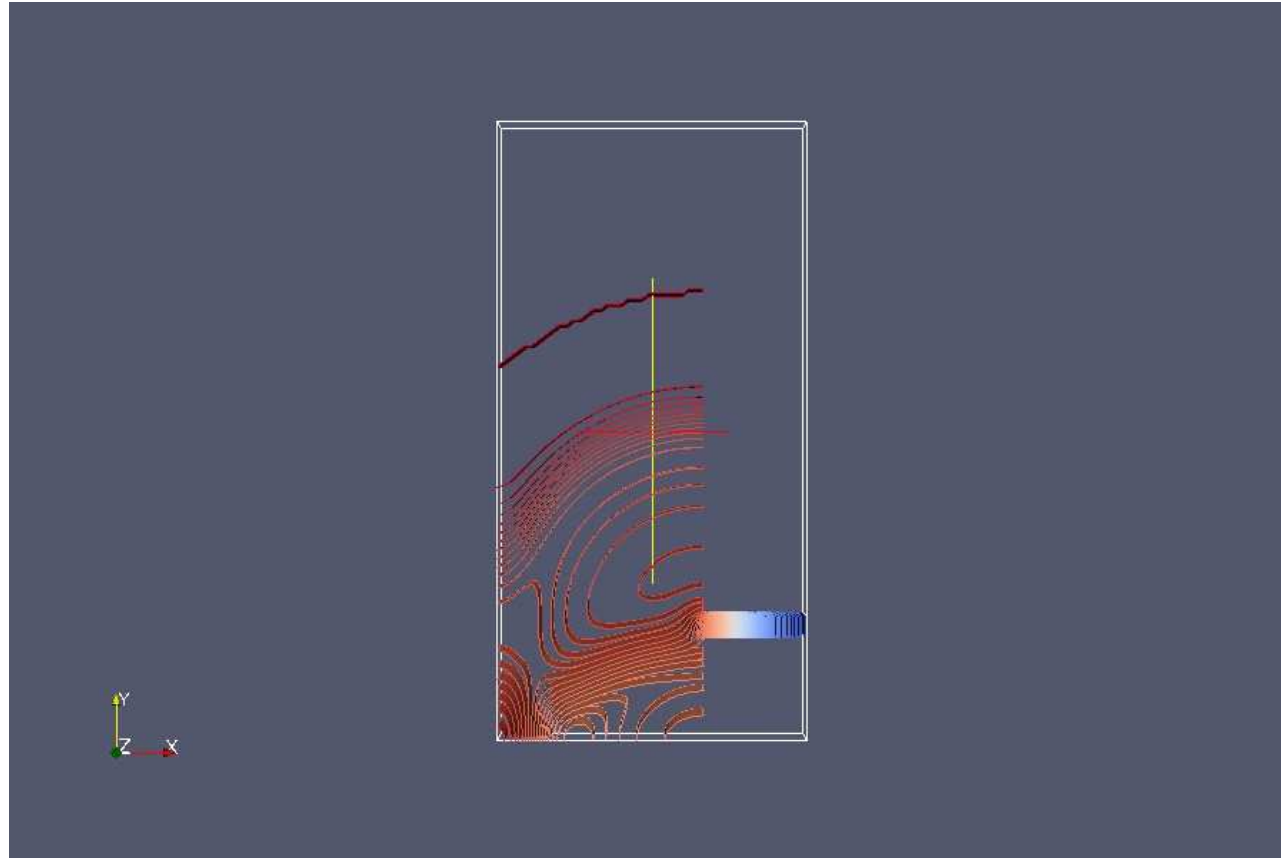


Fig: pressure contours at time= 10

decompressionTankFine

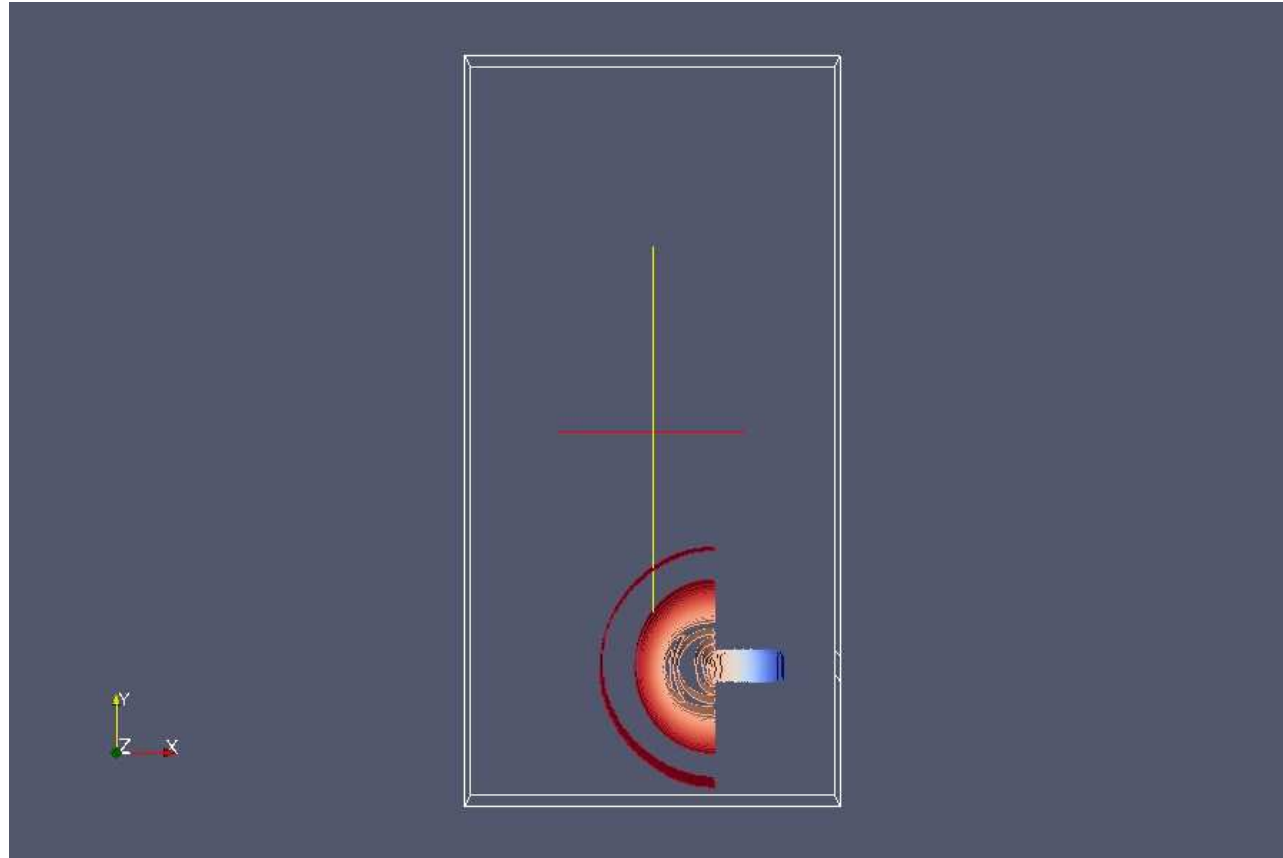


Fig: pressure contours at time= 5

decompressionTankFine continued

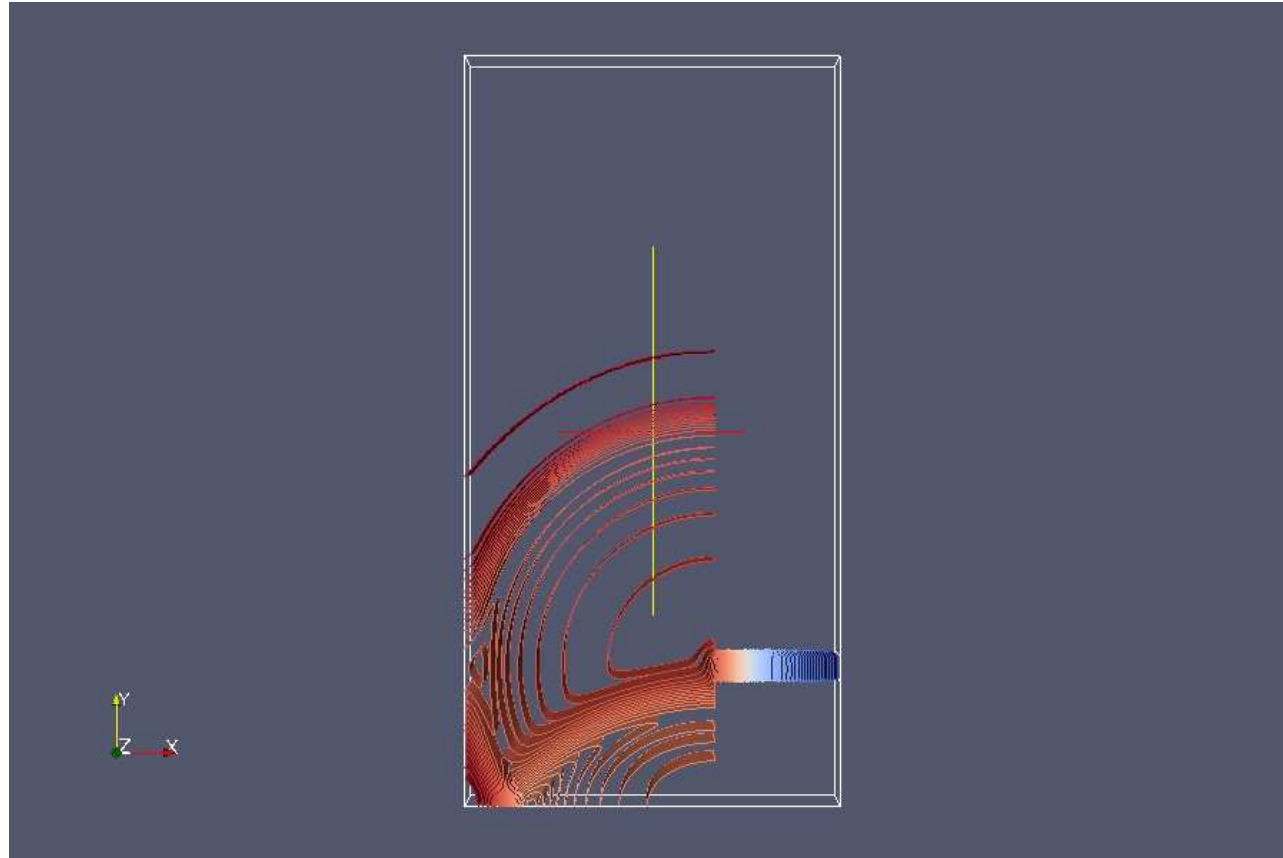


Fig: pressure contours at time= 10

hartmann



Fig: magnetic flux density at time= 2

Modified case: forwardStepFine

This is a modified case of the forwardStep case.
It has a refined mesh of a factor of 2.
But the calculation was run till time= 0.5s.
This is long before reaching the steady state,
which is evident from the figure in the next page.

Modified case: forwardStepFine

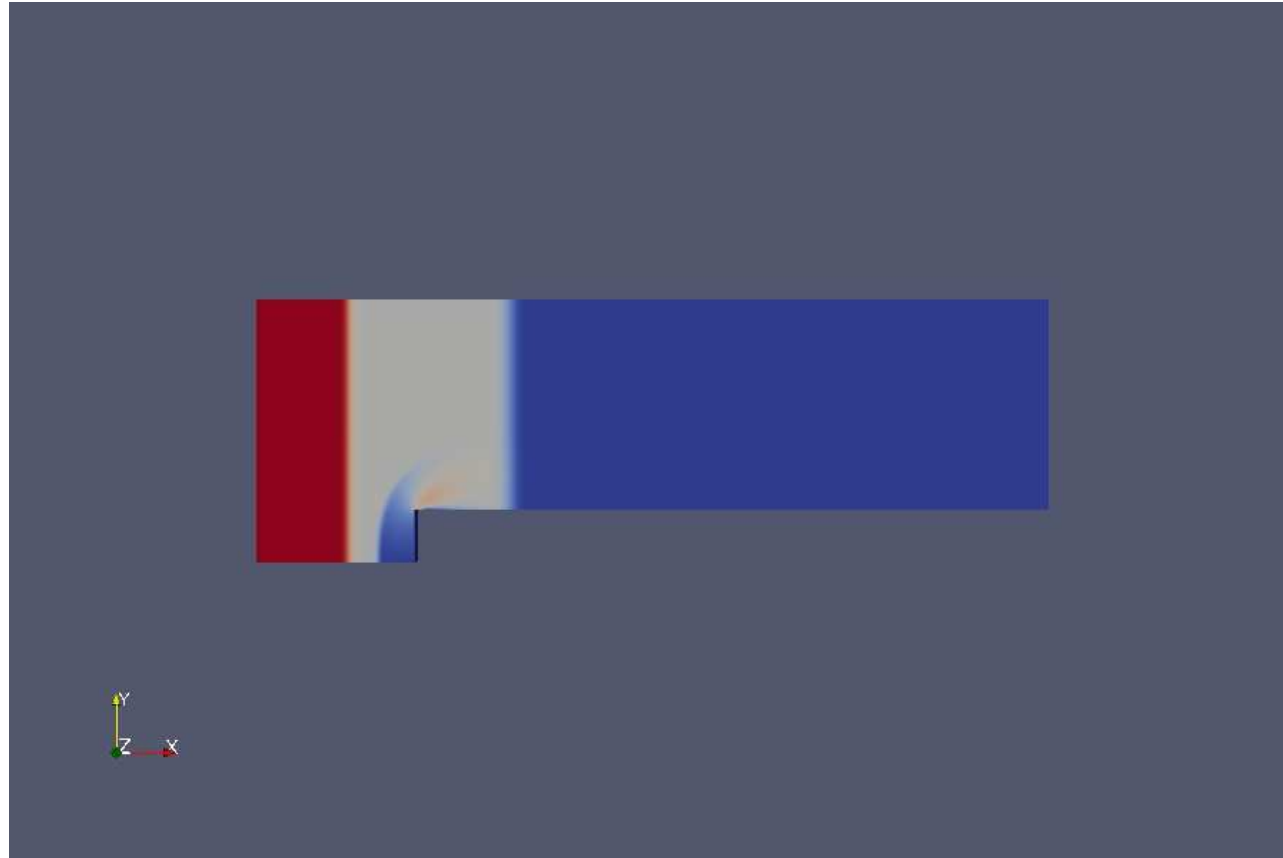


Fig: velocity distribution at time= 0.5...incomplete calculation