

MEng Project Log

by

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Contents

1	8th May	3
2	9th May	3
3	10th May	3
3.1	Important Functions	3
3.2	Case 1: Lid Driven Cavity	4
3.3	Files	4
3.4	Multiprocess	4
4	13th May	4
4.1	Steps to Simflow	5
4.2	Case4: Complie	5
4.3	Multiphase	5
5	14th May	5
5.1	Sockeye	6
5.2	Submit job	6
6	15th May	6
7	16th May	6
8	21th May	6
9	22th May	6
9.1	Output	6
9.2	Initialization of multiphase	7
9.3	Killing waves	7

9.4 multiple jobs	7
10 23th May	7
10.1 Work for DTMB5415	7
11 24th May	8
11.1 Work	8
12 27th May	8
12.1 Work for DTMB5415	8
13 28th May	9
13.1 Work for DTMB5415	9
14 3rd June	9
14.1 Work for DTMB5415	9
14.2 Meeting with Dr.Rajeev	9

1 8th May

1. Applied for the access to ICICS 227
2. Applied for the access to compute canada

2 9th May

1. Installed Gmesh, Paraview and get access to compute canada
2. Read Eigenfrequency analysis from COSMOL
3. Learn how to use Gmesh: geometry part and the mesh part with two case: vertical plane and cylinder
4. Install the Simflow

3 10th May

3.1 Important Functions

1. simflow : run simflow to solve
2. mpirun -nx simflowOmpi -npx
3. simGmshCnvt -msh *.msh :mesh
4. simPlt -type vtk : post processing
5. gmsh -3 : convert geo to msh
6. cd (home) .(current) ..(previous)
7. vi :q :w :q! : quit, write, write&quit, and quit without saving
8. cp (source) (destination) :copy
9. mv (source) (destination) :move
10. scp :copy from others computer
11. rm -r(folder)
12. scp -r ineogi@beluga.computecanada.ca: /scratch/CavityTutorial .
13. scp conroyli@beluga.computecanada.ca: /scratch/CavityTutorial/debug1/*.vtk .

3.2 Case 1: Lid Driven Cavity

1. 10 time steps with 0.1s
2. saved in 'debug1'
3. which simflow :give the location of the first version of simflow
4. /simflow-Nihar/bin/simflow
5. vi simflow.config
6. simPlt -type vtk -min 0 -last 10 in CavityTutorial

3.3 Files

1. cavity.geo
2. cavity.msh : save as msh
3. .crd .cnn .nbc(nodal BC) .srf
4. cavity.def
5. eightNodeBrick sixNodeWedge fourNodeTech
6. simGmshCnvt -msh Case1.msh

3.4 Multiprocess

1. InteractiveNode
2. salloc -ntasks=16 -account=def-rjaiman -time=1:0:0 -mem-per-cpu=4G
3. squeue
4. multiple cpu task: simflow.config
5. mpirun -n 16 /simflow-Nihar/bin/simflowOmpi -np 16

4 13th May

1. Fix Case1 files -> the problem should be in the mesh file
2. Check email for the lab access
3. Run Case2: sucessfully run and the vortec shedding is observed
4. Run Case3: VIV case with movable cylinder, follow the code project 1 article and try to reproduce the results.
5. Run Case4: wave-run-up case

4.1 Steps to Simflow

1. Mesh - Geometry - 3D/2D w 1 layer thick - physical groups - nbc srf - Mesh.MshFileVersion = 2.13;
2. Def file - geo -> msh - simflowCnvt
3. Post processing:
4. scp conroyli@beluga.computecanada.ca:/home/conroyli/scratch/Case1-plate/debug1/*.vtk
.
5. Paraview :vtk
6. MATLAB: Oisd Othd
7. Restart Simflow: Rst
- 8.

4.2 Case4: Complie

1. src - solbc.c - change the height.. - save and "make" in src
2. make clean to clear
3. make again
4. def - userdefined
- 5.

4.3 Multiphase

1. Allen-Calm (Phase field)
2. order parameter = ϕ from -1 to 1 (air to water)
3. src-solpro.c

5 14th May

1. /scratch/st-jelovica-1/ljc2018/
2. ljc2018@sockeye.arc.ubc.ca cwl password
- 3.

5.1 Sockeye

1. make clean
2. cp ../src-cc/src/y.* .
3. make

5.2 Submit job

1. computecanadajob.sh
2. sbatch
3. make

6 15th May

1. Case 4 wave-run up submitted
2. Case 3 VIV case submitted

7 16th May

1. Case 3 VIV case with corrected parameters submitted

8 21th May

1. N/A

9 22th May

9.1 Output

1. oisd → Integrated Force
2. othd → Nodal Time History
- 3.

9.2 Initialization of multiphase

1. x is the longitudinal, z is up and down
2. solProc.c line 377 $3i+2$ is the z coord, need + or -1
- 3.

9.3 Killing waves

1. Method 1: ship at 0.25 L of the domain and l as the ship length, domain: 15-20l and 5l for the very coarse
2. fine mesh in front, very coarse at the end
3. Method 2: solTimeInteg
4. damploc → start location of damping
- 5.

9.4 multiple jobs

1. change simMakeInp → run simMake → make: compile c++ → simflow and simflowOmpi
2. make clean + copy y files
3. Wavetank: $L=15+5m$, $H = 6m$, $W = 8m$
- 4.

Task: examine waves from 0.2-2m Jobs: height 0.8m & 1.6m and wave length 1m & 2m

1. 1: 0.8 & 1
2. 2: 0.8 & 2
3. 3: 1.6 & 1
4. 4: 1.6 & 2

10 23th May

10.1 Work for DTMB5415

1. Question: wave case not reasonable

2. Load the DTMP5415 ship model into gmsh
3. reverse it in the x-direction to have the head of the ship facing -x
4. scale the model down into 1:24.83 according to the Varhiala's thesis
5. re-run the testing case2 for the wave in 100 ts and 5 outFre to see if the input wave is functioning
6. $L_{pp} = 5.72 \text{ m}$ x→ -8m and 12m y→ +-10m z→ +-8.49/2m
7. 4 tests for wave are discard, new test with height = 0.5m and 3 1 3 "test5"
8. test5 failed → need to ask Ishan

11 24th May

11.1 Work

1. Question: how is the depth of the water defined in the solBc.c
2. need to consider the distance between the bottom of the model and the origin point
3. free surface to bottom of the ship is 0.248m
4. need to sizefield the mesh
5. wave is generated correctly now but to see if the amplitude is correct → Test6: 2000 time steps
6. mesh problem is solved, now need to refine the mesh according to the thesis
7. origin of the ship to the lowest point is 0.12m, so the wave should be generated at $0.284\text{m} - 0.12\text{m} = 0.164\text{m}$
8. stp file needed in sockeye system? → use the msh file generated in Gmsh
9. how to control the Output? → timehistory
10. definition file? ALE and Multiphase together? → yes, all three together

12 27th May

12.1 Work for DTMB5415

1. makeup the definition file for DTMB 5415 ship simulation
2. copy from previous def files

3. solvesquence mode? dynamic or transient
4. U_{inf} is computed from Re to be 1.86515, so that the time step is 0.01s.
5. name of the mesh motion?
6. all Y to zero?
7. done modifying the definition file
8. msh conversion failed → ask Ishan

13 28th May

13.1 Work for DTMB5415

1. fix the msh and related files
2. wave height H_w is computed to be $LPP * 0.056 = 0.32032$
3. wave number ? k_w is $\frac{2\pi}{LPP} = 1.09845$
4. time period of wave T_w is $\frac{0.629 * LPP}{U_{\text{inf}}} = 1.929$
5. `salloc -nodes=1 -account=st-jelovica-1 -time=1:0:0 -mem-per-cpu=4G`
6. change the type of element on the srf to be `threenodetriangle`

14 3rd June

14.1 Work for DTMB5415

1. fix the DTMB5415 simulation
2. need to change the dir of Open MakeFile and change SIMFLOW-HOME to your directory
3. wave case test 7 with the src files given by Ishan

14.2 Meeting with Dr.Rajeev

- 1.