MEng Project Log

by

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Contents

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 multuphase

1. x is the longitutial, z is up and down
2. solProc.c line 377 3i+2 is the z crd, 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: complie c++ –> simflow and simflowOmpi
2. make cleam + copy y files
3. Wavetank: L=15+5m, H = 6m, W = 8m
4.

Task: exaime 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 Varhihal'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. Lpp = 5.72 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. orgin of the ship to the lowest point is 0.12m, so the wave should be generated at 0.284m - 0.12m = 0.164m + 2.46m (min z) =
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

14.2 Work for wave

1. wave case test 7 with the src files given by Ishan for 100 timesteps –> the test is success, the input is good
2. test 8 for longer times to see the damp out, 4000 steps with 200 out –> run again

14.3 Meeting with Dr.Rajeev

1. next meeting on June 09 for industry

15 4th June

15.1 Work for DTMB5415

1. exaime the result of DTMB test and test 8 and the TDP test.
2. more info on http://www.simman2008.dk/5415/5415-geometry.html

15.2 Work for wave

1. run the test 8 again with 4000 steps –> still not working
2. simPlt -type vtk -min 0 -last 10

16 5th June

16.1 Work for DTMB5415

1.

17 6th June

17.1 Work for wave

1. the wave is correct in the wave run up case
2. so now, run the wave tank case with the same src file for test 9 and change the depth of the water as test 8
3. 1118420 is the 3m (test 8) –> 1120985
4. 1118455 is the test 9 with the same solBc.c files with the wave run up case –> 1120952

18 7th June

18.1 Work for wave

1. test 8 and 9 are both success
2. now need new tests for 1. wavelength 1 and everything else same –> test1

3. 2. wave period 1 and everything else same –> test2
4. 3. wave period 2.5 and everything same –> test3

19 13th June

19.1 Work for structural modes

1. got the Inp files
2. create the folders
3. run
4. run
5. comment out solTimeInteg.c line 530 damping codes
6.

19.2 Work for waves

1. comment out solTimeINteg.c line 530 damping codes

20 14th June

20.1 Work for DTMB5415

1. test for not moving ship to see if the domain is correct

21 17th June

21.1 Work for DTMB5415

1. test submitted last friday failed, need to check the boundary conditions in the definition file.
2. change dynamic to transient and reduce the iteration for non-linear calculation –> re-run the test

22 18th June

22.1 Work for DTMB5415

1. examine the test submitted yesterday –> tmr
2. use exactly the same definition file from the wave Tank case to see the difference –> NmTest3 –>failed
3. test 4 with my modified definition file –> sim succeed –> problem caused by highFreDampingFac?

23 19th June

23.1 Work for DTMB5415

1. since no error shown in the simflow, need to ask Ishan –> ask Xiaoyu
2. since the simple waveTank case is success, Xiaoyu suggests to change piece by piece from the waveTank case to the ship case
3. so here is the procedure:
4. put the ship into the waveTank case domain run the sim see the result
5. need test 5 to see the effect of highFreDampingFac –> need to ask xiaoyu

24 20th June

24.1 Work for DTMB5415

1. shift-x tests –> move the entire domain to have the origin located at the inlet surface does not work
2. do not use simflowOmpi-DTMB use the same simflow exe as the waveTank case –> test 6 (1316325)

25 24th June

25.1 Work for DTMB5415

1. want to see the effect of changing the domain

2. reduce y to 4m tests –> reduce-y-test1 sucessed, not failing with simflow-1
3. with simflow-DTMB –> test2

26 2nd July

26.1 Work for DTMB5415

1. simGmshCnvt -msh *.msh
2. /* Hard code for inlet wave run-up */
3. H-wave = 0.32032 ; /* Wave height */
4. D-water = 3.0 ;//2.624 ; /* Water depth */
5. T-wave = 1.929; /* Wave period */
6. L-wave = 0.9108 ; /* Wave length */
7. PI = 3.14159265 ;
8. G = 9.81 ;

27 3rd July

27.1 Work for DTMB5415

1. sockeye is not avaible currently
2. working on beluga
3. modifying files and setting up the sim

28 4th July

28.1 Work for DTMB5415

1. check the sim set up yesterday
2. DTMB5415 Tank test1 failed
3. increase y test succeed
4.

29 5th July

29.1 Work for DTMB5415

1. check the sim set up yesterday
2. need to check the moving case
3. try DTMB5415 moving (increase y) test2 with inertia and stiffness set to 1 –> pending
4.

30 7th July

30.1 Work for DTMB5415

1. refine the mesh near the ship
2. ask for the ALE definition file from Ishan
3. why ale is not moving ?
4. how to track the heave response of the ship? probe on the ship? coordinates?
5. how to trach the vertical fluid force?
6. try DTMB increase y test 2 with wave set up in the thesis
7. now the DTMB means the wave set up in the thesis
8. wave test set up is "wavetest"

31 10th July

31.1 Work for DTMB5415

1. test Gabin's file
2. check the calculation from the Vaibhav thesis
3. use the given definition file to run the simulation

32 15th July

32.1 Work for DTMB5415

1. back to work on sockeye
2. moving with given def file test1 with reduced y domain and wave test conditions
3. –> failed –> need to find the issue –> failed

33 16th July

33.1 Work for DTMB5415

1. use the matchmeshvelocity in my definition file
2. still internal error

34 18th July

34.1 Work for DTMB5415

1. after ask Xiaoyu
2. within DTMB-M-reducey
3. Test1 make all non linear iteration to be 1 and see what is wrong here (time step =10) –> 10 steps sucessd –> run for longer time (test1-1) –> failed after 73 steps (chaos) probably wrong with the inlet velocity
4. Test2 make it not moving again to see what is wrong in the given (rigid.def) definition file (/DTMB5415-NM-reduce-y-Test3)
5. remove the initial inlet velocity –> DTMB-moving-reducey-test2 (1501309) –> make 4000 steps and 80 out Fre - DTMB-moving-reducey-Test3 (1501430)
6. xiaoyu suggested to test the not moving case with just a current not a wave and then turn it into a wave so see if the problem is in the ALE, boundary conditions, or the domain itself.
7. add the inlet velocity and fix the ale ship Z motion –> DTMB-moving-reducey-test4

35 19th July

35.1 Work for DTMB5415

1. re-build simflow-DTMB

36 22th July

36.1 Work for DTMB5415

1. inspired by Ishan, no inlet velocity, hydrostaticoutflow to be off, tune a outflow velocity, with the damping off as well, with DTMB wave condition–> DTMB-moving-reducey-test5(1526607)
2. test5 succeed without error, but the water is too deep and is draining out since the outlet velocity is too high (?), so reduce the water depth and out velocity to be 1.0 –>Test6
3. 1.0 outflow velocity is still too fast –? reduce to 0.5 –> test7 –
4.

37 23th July

37.1 Work for DTMB5415

1. test7 is still draining out, the outlet velocity should be related to the size of the domain as well
2. test8 with 0.3 outflow velocity
3. test9 with the test wave condition for seeing if the chaos remains (1538065)
4. at the same time, run a test1 with increased y using the same def file and test wave conditions

38 24th July

38.1 Work for DTMB5415

1. according to Ishan, chaos could be solved by increasing the domain length and have coarser mesh at the end –> DTMB-M-increas-xy series of tests

2. –> test 1 with 2000 ts and DTMB wave condition –?failed neg jecobian –> adjust the mesh and turn on the damping

39 26th July

39.1 Work for Split Oulet

1. Split outlet test1, created the domain as stated by Ishan and convert the mesh
2. modify the definition file and using the test wave condition, highFreDampingFac to be 0.5 and 1000ts and 20 out freq
3.