

CFD SOFTWARE LAB

PURPOSE: The purpose of this lab is to give you some experience with CFD software. For it you will set up a simulation for a floating body in a wave tank.

PROCEDURE: Create a CFD mesh of a wave tank. Import the STL file for a body into the mesh. Set the simulation parameters. Run the simulation to get the motion of the body step by step in time. Produce an animation of the motion.

REPORT: Describe the steps you took to do the CFD. Present the most important menus used by the simulation. Present the animation results. Discuss the results.

CFD LAB STEPS

(1) Click on the FLOW 3D icon to get to Navigator. (2) Under Navigator create new workspace on desktop. (3) Under Navigator create new simulation on desktop. (4) Click on Model Setup to get its submenus. (5) Under General set things like free surface. (6) Under Physics activate things like GMO. (7) Under Fluids load data for water. (8) Under Mesh Setup create the mesh. (9) Under Mesh Setup import body STL file. (10) Scale and translate body to fit mesh. (11) Under Boundaries set boundary types. (12) Under Initial set things like speeds. (13) Under Output set data spacing. (14) Under Numerics click on one fluid with interface. (15) Under Simulation click on run. (16) Under Analyze click on 3D probe. (17) Expand time and click on STL and Render. (18) Click on animation.

General

Finish time <input type="text" value="10.0"/>	Interface tracking <input checked="" type="radio"/> Free surface or sharp interface <input type="radio"/> No sharp interface	Number of fluids <input checked="" type="radio"/> One fluid <input type="radio"/> Two fluids	Units Simulation units <input type="text" value="SI"/>
<input type="button" value="Finish condition"/>	Flow mode <input checked="" type="radio"/> Incompressible <input type="radio"/> Compressible <input type="checkbox"/> Steady-state accelerator (Non-physical transients)	Mentor options <input type="radio"/> No mentor help <input type="radio"/> Offer suggestions <input checked="" type="radio"/> Offer suggestions and take action	Version options Version <input type="text" value="Double precision"/> (Default) Number of processors <input type="text" value="All Available"/> (Default) <input type="checkbox"/> Run serial code if parallel tokens in use (Default)
		Notes <input type="text" value="float in waves"/>	<input type="button" value="Font..."/> <input type="button" value="Reset to Defaults"/>

Geometry

- Global
- Component 1 
 - Name
 - Material Name
 - Component Type
 - Subcomponent 1: C:\Documents and Settings\mhinchey\Desktop\float.STL
 - Geometry File ->
 - Name
 - Subcomponent Type
 - Min/Max
 - Transformations
 - Magnifications
 - Global
 - X
 - Y
 - Z
 - Rotations
 - Translations
 - X
 - Y
 - Z
 - Limiters
 - Mass Density
 - Contact Angle
 - Type of Moving Object
 - Moving Object Properties
 - Type of Deforming Object
 - Collision Properties
 - Solid Properties
 - Surface Properties
 - Initial Conditions
 - Electrical Properties
 - Core Gas Model Properties
 - Lost Foam Properties
 - Porous Properties
 - Output
 - Baffles
 - Springs and Ropes

.... Baffles
.... Springs and Ropes
[-] Mesh - Cartesian
 [-] Block 1
 [-] X Direction
 Total Cells 100
 [-] Fixed Pt.(1) -10.
 Cell Size 0.2
 # of Cells 100
 [-] Fixed Pt.(2) +10.0
 [-] Y Direction
 Total Cells 20
 [-] Fixed Pt.(1) -2.
 Cell Size 0.2
 # of Cells 20
 [-] Fixed Pt.(2) +2.
 [-] Z Direction
 Total Cells 10
 [-] Fixed Pt.(1) -2.0
 Cell Size 0.3
 # of Cells 10
 [-] Fixed Pt.(2) +1.0
 [-] Render Space



















