Computational Aerodynamics Questions & Answers

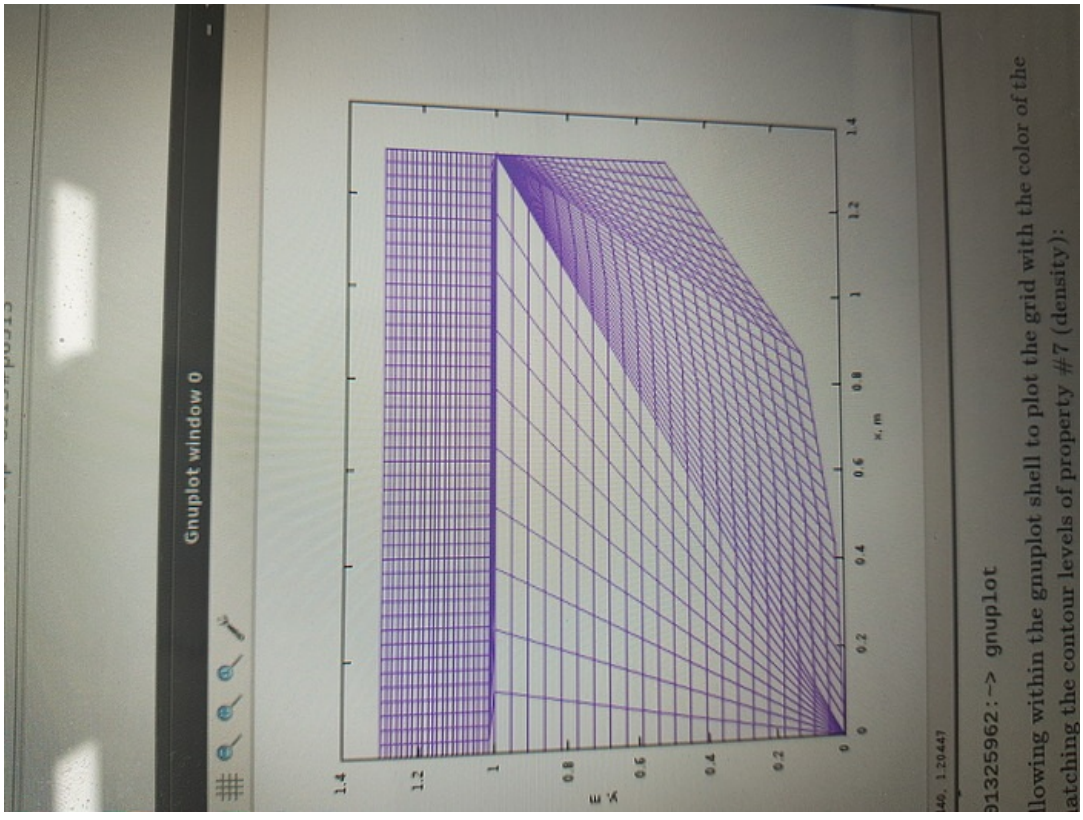
Question by Student 201327132

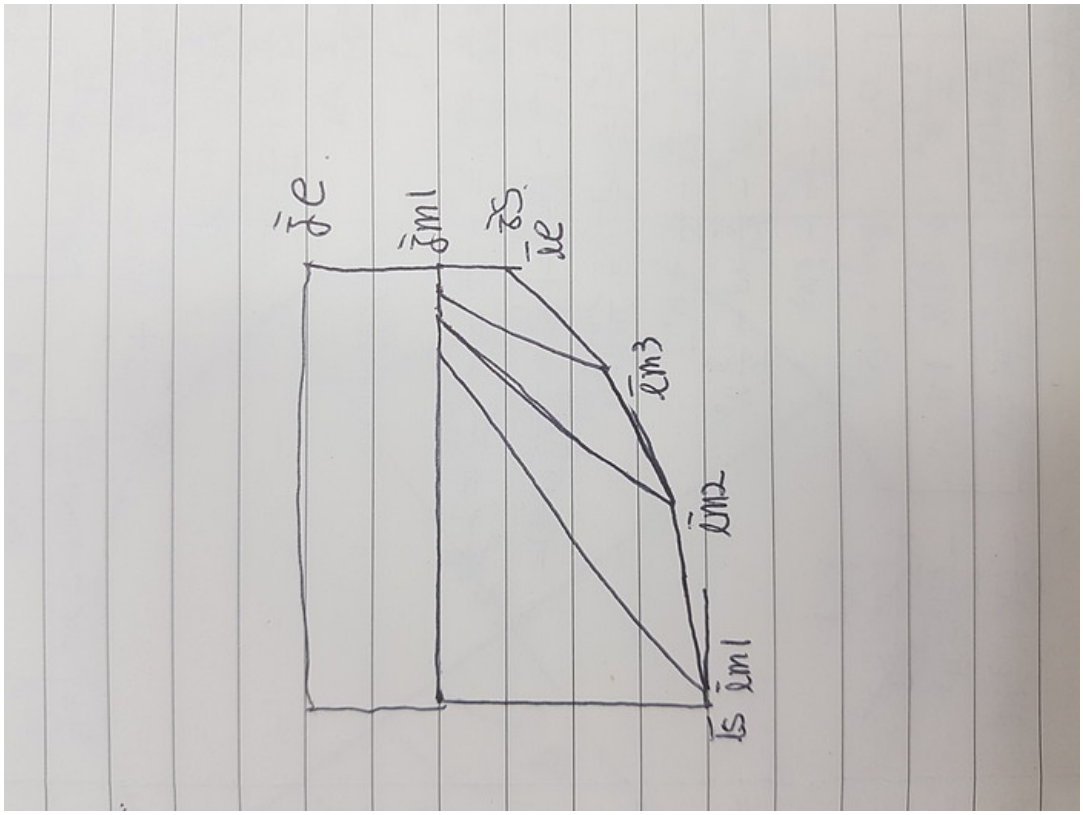
Professor, I have a question about design. In problem 3, Should we consider about 3 shocks when I generate grid? I made grid that is consider 3shocks. But I think it is not correct grid. If we should consider about 3 shocks, Would you please some hint for me?

Yes, for problem 3, there should be 3 oblique shocks and the pressure ratio across each shock should be the same. You need to design your inlet so that these 3 shocks appear, have all the same pressure ratio, and meet at one point. I am not sure what you don't understand. Can you explain better the problem?

Question by Student 201327132

Thank you professor. I have a problem with some grid. My strategy is attached pircture. To generate oblique shocks, I set the very small value that is length of between (im 1, jm 1) and (im 2, jm2). Likewise (im 3, jm3) and (ie, js). And plot the my strategy(also i attatched picture). I think it is not correct method, but i didnt find better method. Sorry for my lack of explanation.





Your grid has issues. You should make the grid so that the spacing is more or less uniform everywhere. Don't worry about making the grid parallel to the shocks. The shocks can go through the cells at an angle — this is fine. Simply make sure that your bottom wall has the right shape, that the cells are more or less of the same size everywhere (and are not distorted as in your mesh), and the shocks will appear correctly positioned.

Question by Student 201327103

professor, How can I open the post file? I want to know number of properties, like density : 7, but I can't open the post file.

The instructions are in the CFDWARP HOWTO here:

https://bernardparent.ca/viewtopic.php? ... 6568#p6568

You need to read in the data file with the -i flag and output it to a post file with the -op flag. Also, specify a gnuplot datafile with the -pt gnuplot flag.

Question by Student 201427116

Professor, I am doing Design Problem #2, flow over cylinder. After manipulating some code, I printed out drag coefficient but found some weird drag coefficient. The drag coefficient had negative value. Can I ask you some advice for this negative coefficient?

Also, I cannot understand what those xstation[] or Area[dim] in Post() module

mean. If I need all of xstation[1], xstation[2], and xstation[3]? or can I just erase it? It will be big pleasure of me to learn more about that. Then I may find out some errors in that Post(). Thank you.

Please attach a picture of the pressure contours around your cylinder. Maybe your flow is not yet at steady-state. Because you are doing the cylinder case, you don't need the xstation. Inside the Post() module, delete the part about the x-station and only keep the line Fpressure[dim]=_Fpressure(... Then, add a bit of code to find the drag coefficient using Fpressure[1] (the pressure force acting on the body along x).

Question by Student 201327132

Professor, I have a question about design problem No.4. I run a my case. And I tried to find converge point of shock. But I don't know each shock angle at point. Do I need the shock angle? If not so, I think we should know length of between each shock. I have tried a lot. I didn't find converge point. Thank you.

Problem 4 is harder than the others. You need to find σ and δ for each shock using the obliqueshock program. Once this is done, you need to find the bottom surface of the ramp that will make all shocks meet each other at one point (such is only function of H, and the 3 δs and σs). Thus, this requires a bit of geometrical calculations on paper. I recommend another problem if this is taking too long.

Question by Student 201327103

professor, i have some problem to run 'warp -r control.wrp -i data.01 -opm'. Terminal say 'could not interpolate at j=0 k=0 for xcut=1.000E-01 m..' what this mean?

Here xcut is the xstation you specified in the Post() module. The program can't find a proper xstation at 0.1 m. If you are solving Problems 1 or 2, you don't need to create xstations, so get rid of the code related to the xstations within Post(). If you are solving Problems 3 or 4, you need only one xstation fixed to the x just slightly before the domain exit.