

Computational Aerodynamics Questions & Answers

Question by Student 201427102

I wrote at terminal

./warp -r rarefaction.wrp -i out.01 -oi out.01i -q

But Terminal said

Data file has 20 grid lines along i but the control file specifies 40 grid lines.

How can I correct this problem?

Hm, this means that the file out.01 was created with a different mesh size than is now specified in your control file. I recommend not to use the interpolation file flags -oi or -ii if this gives you trouble (this saves on some computing time, but is a bit harder to operate). Simply create a new out.01 with the -o flag without reading in out.01i. That will work just as well but will be a bit slower.

Question by Student 201427564

Professor, I have a question about Question#2. Is it possible that P_{i+1} increase while P_{i-1} decrease?

I guess you mean an increase/decrease from one mesh level to the other? Yes, it's possible. This means the derivative is becoming larger. 1 point bonus.

Question by Student 201427564

Professor, I have a question about calculating 'p'. In your table, $r = \frac{\Delta x_c}{\Delta x_f}$. By this definition, is it correct that $r = \frac{1}{\sqrt{2}}$? Because the fine one is $\sqrt{2}$ times more fine than coarse one.

No, it's the opposite.. This was mentioned in class.

Question by Student 201238707

Professor, When I start "Assignment 7 - Question #2". I just use

$$(R_{\Delta})_{\max} = 1E - 3 \text{ or find convergence value of } (R_{\Delta})_{\max}$$

You can keep xiverge set to 1E-3. 1 point bonus.

Question by Student 201527110

Professor, I don't understand what does 'Semi Disc. equation' exactly what we do last lecture. Usually, scalar equation can be denoted as

$$\frac{\partial u}{\partial t} + a \frac{\partial u}{\partial x} = 0$$

, but I wonder why we didn't consider about wave speed 'a' in 'Semi Disc.

equation'. (I think you noted semi disc eq as $\frac{u_i^{n+1} - u_i}{\delta t} + \frac{u_{i+1/2} - u_{i-1/2}}{\delta x} = 0$)

That's a mistake: I should have added the sound speed of course. Please correct your notes. Because it is constant, an easy way to add the sound speed is to change Δt to $a\Delta t$ everywhere Δt appears. This will make more sense! 2 points bonus.

Question by Student 201427564

Professor, when you explain about 'Roe Average', you wrote like this.

$A_{i+\frac{1}{2}}(U_{i+1} - U_i) = F_{i+1} - F_i$. I can not understand that how can it be possible that $A_{i+\frac{1}{2}}U_{i+1} = F_{i+1}$ and $A_{i+\frac{1}{2}}U_i = F_i$. Because subscript of A and U are different each other.

Hm, I don't understand the question. You need to explain better what you don't understand..