Heat Transfer Questions & Answers

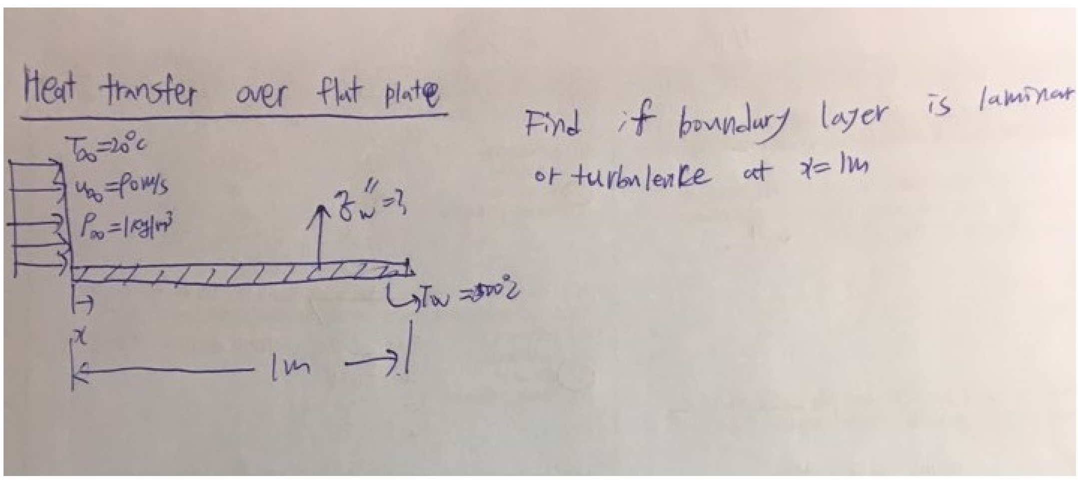
Question by Student 201427132

I have some questions about previous the lecture at 5/11.
While you give an example, you missed the assumptions and let assumptions as blank. So, i try to fill it out and here's my idea. :
1. Steady-state flow 2. Plate should be flat and thin plate
3.ρ, c, k are constant 4. $E_c << \frac{1}{Pr}$
I wonder whether my guess is right or wrong.

Hm, that lecture was more than one week ago.. I forget what that problem was. You should explain this in your question.

Question by Student 201427132

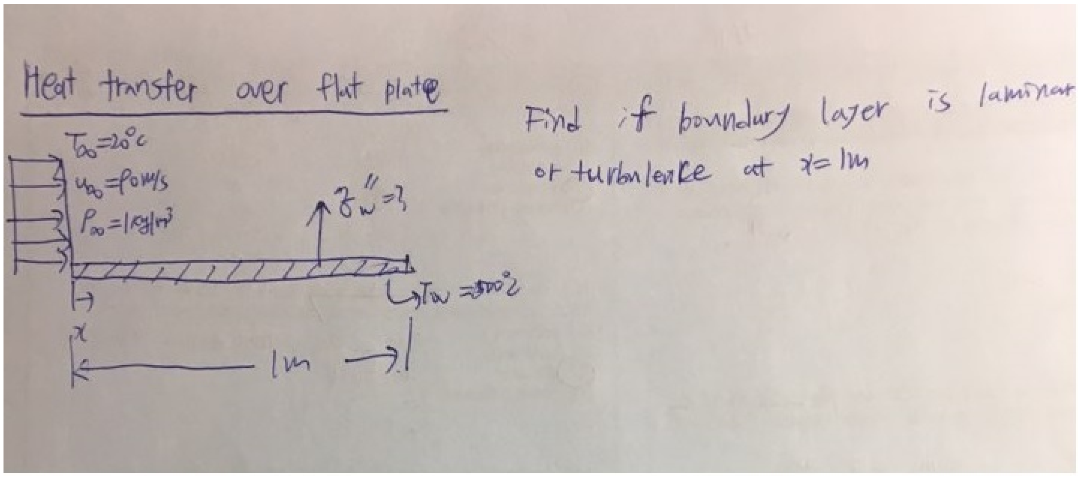
I rewrite my question with picture.



The example wanted whether flow is turbulence or laminar at x = 1m. While you give this example, you missed the assumptions and let assumptions as blank. So, i try to fill it out and here's my idea. : 1. Steady-state flow 2. Plate should be flat and thin plate 3.ρρ, c, k are constant 4. EcEc<<1Pr I wonder whether my guess is right or wrong.

This time, the typesetting is hard to read. Please rewrite the question with proper typesetting and I'll answer it.

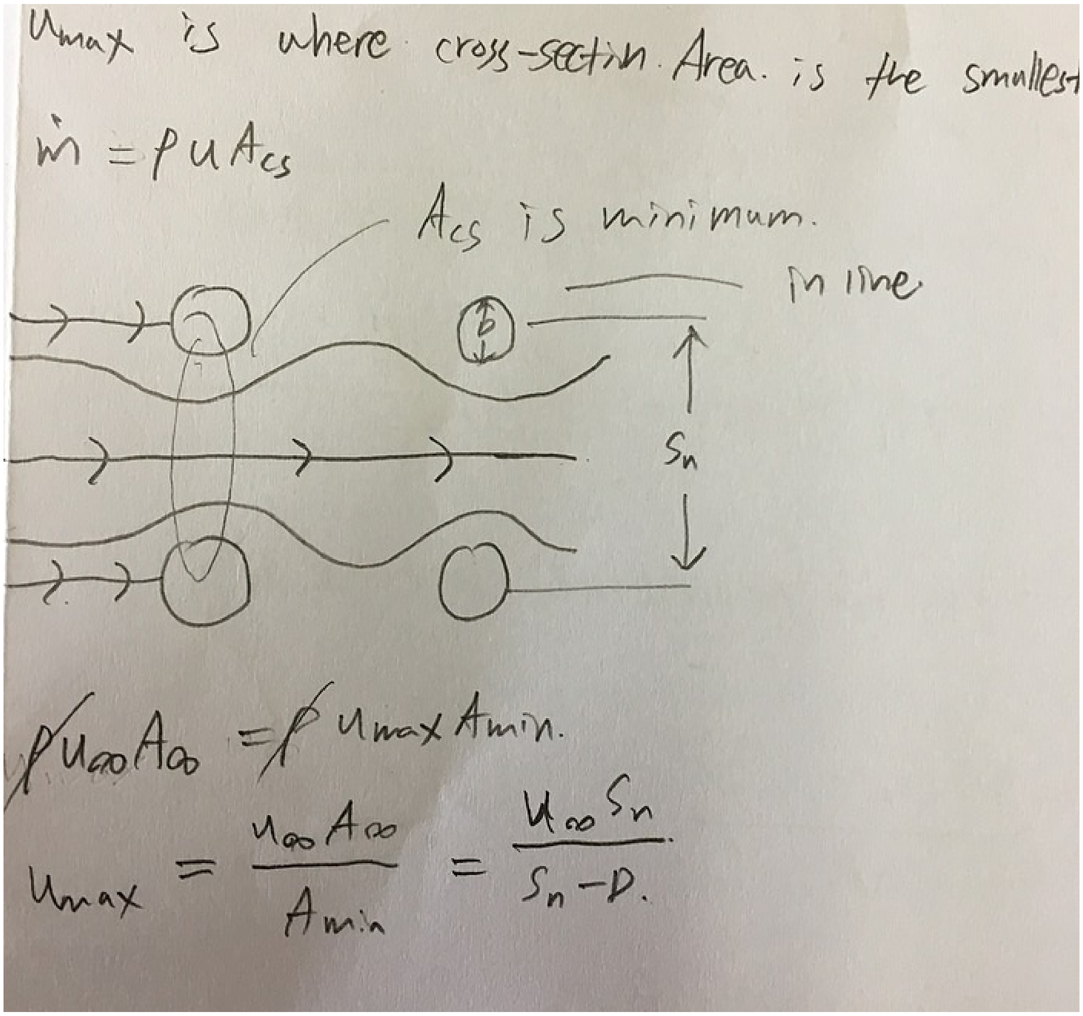
Question by Student 201427132



While you give this example, you missed the assumptions and let assumptions as blank.
So, i try to fill it out and here's my idea :
1. Steady-state flow
2. Plate should be flat and thin plate
3.ρ, c, k are constant
4. $E_c << \frac{1}{Pr}$
I wonder whether my guess is right or wrong.
sorry to bothering you

Here ρ, c, k are evaluated at the film temperature. So you should say that they are assumed constant at the film temperature. Also, you should mention S-S and no radiation. It's also better to say negligible viscous dissipation rather than $\mathrm{Ec} \ll 1/\mathrm{Pr}$. 1.0 point bonus.

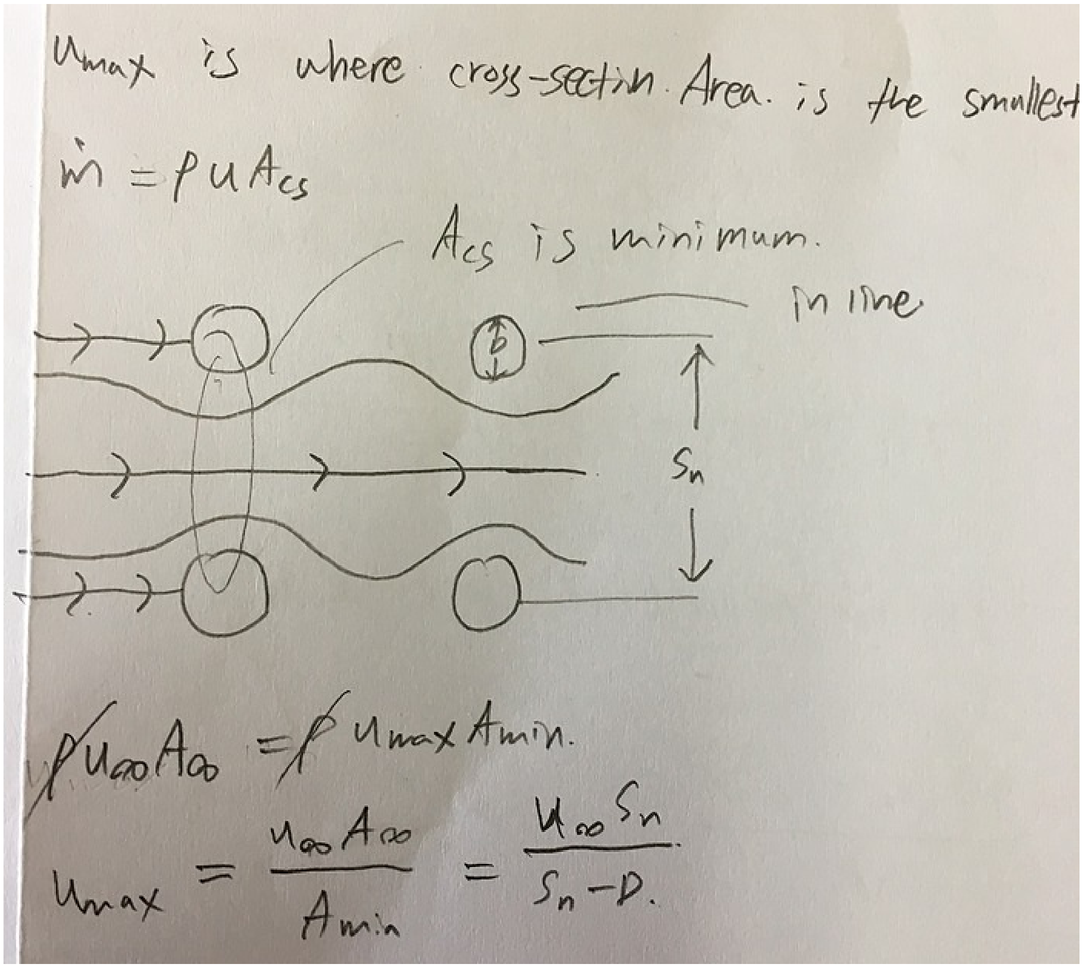
Question by Student 201427132



In previous lecture at 5/16, while you are teaching the inline tube bank, you said that $U_{max} = \frac{U_\infty A_\infty}{A_{min}} = \frac{U_\infty S_n}{S_n - D}$.
I think it should be corrected to $U_{max} = \frac{U_\infty A_\infty}{A_{min}} = \frac{U_\infty S_n^2 \Pi}{(S_n - D)^2 \Pi} = \frac{U_\infty S_n^2}{(S_n - D)^2}$.
Is there something specific reason?

I'm not sure why you want to correct it this way... You need to explain better what your idea is, because I can not understand.

Question by Student 201427132



Dear professor, i rewrite my question.
In previous lecture at 5/16, while you are teaching the inline tube bank, you said that $U_{max} = \frac{U_\infty A_\infty}{A_{min}} = \frac{U_\infty S_n}{S_n - D}$.
I guess that shape of cross-section of the path of air is circle.
So i think it should be corrected to $U_{max} = \frac{U_\infty A_\infty}{A_{min}} = \frac{U_\infty S_n^2 \Pi}{(S_n - D)^2 \Pi} = \frac{U_\infty S_n^2}{(S_n - D)^2}$.
If shape of cross-section of the path of air is not circle, what the shape should be?

Well, how can the cross-sectional area be a circle of radius S_n? this doesn't make sense.. We are dealing with a tube bank where S_n is a spacing between the tubes, and not a radius of anything. 0.5 point bonus boost.

Question by Student 201427102

For bulk temp in ducts, v was not 0. Because you didn't get rid of v at enregy eq. But if L is very very long, does flow becomes fully developed?? And can we assume v=o for all y direction in energy eq???? And can get rid of v at energy eq.??

No, be careful here. When deriving $\dot{m}(c_{p2}T_{b2} - c_{p1}T_{b1}) = q_{\rm w}$, we did not assume that the flow is fully developed. Thus the equation $\dot{m}(c_{p2}T_{b2} - c_{p1}T_{b1}) = q_{\rm w}$ can be applied for any internal flow either fully developed or not. 1 point bonus boost.