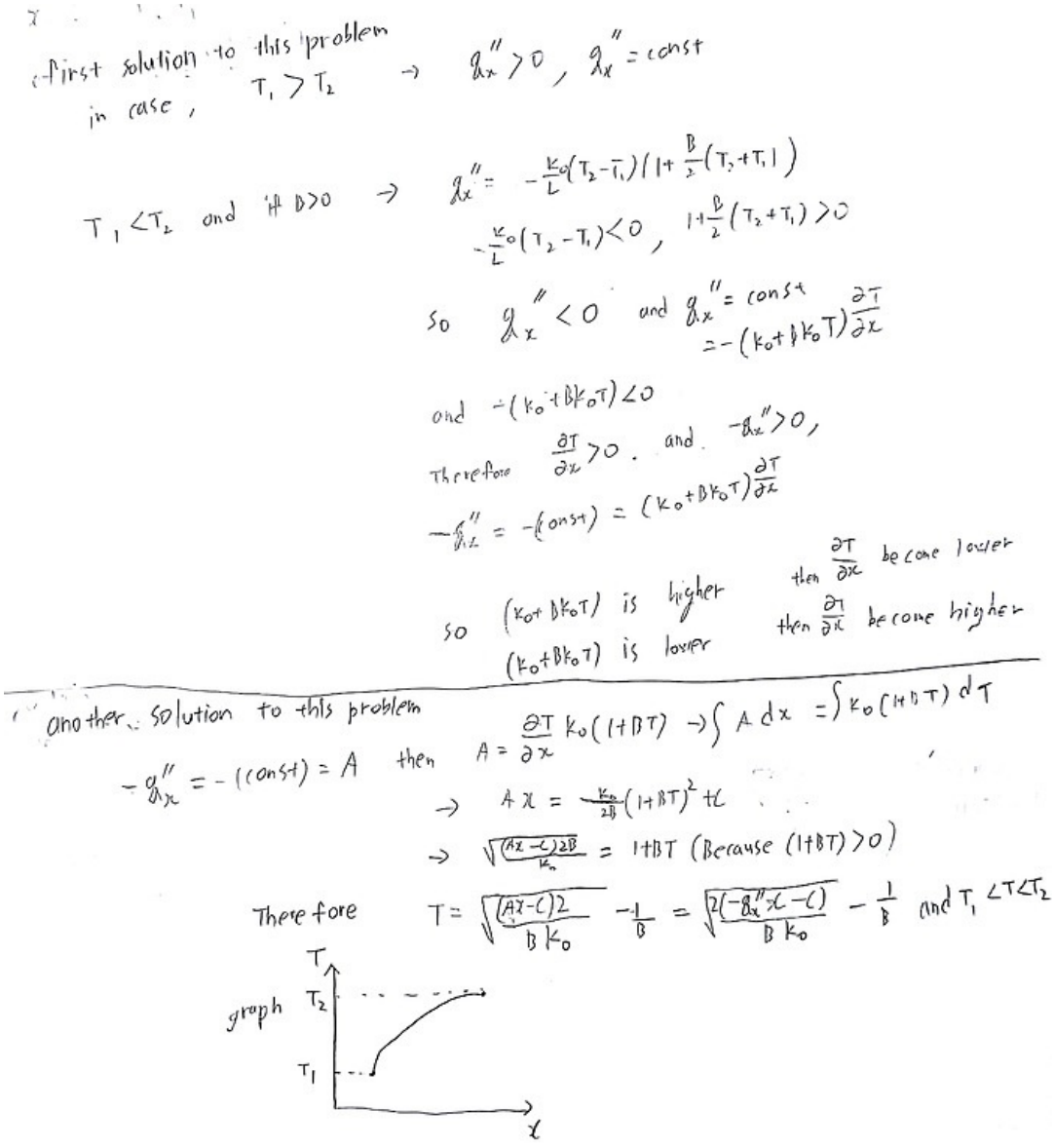
Heat Transfer Questions & Answers

Question by Student 201327128

Dear professor, I would like to answer about your question(this monday).



I'm sorry, I'm not good at writing with a formula on the computer. So I attached a image.

You need to typeset your post using LaTeX. Only attach images for figures/schematics. Also, other students have provided good explanations already — we need to move on now.

Question by Student 201527110

Professor, I have question about the differences between heat flux and energy density. At one glance, they have exactly same unit (W/m^2) and similar form (

σT^2). So is there any differences between those or assumptions (conditons) of those?

Here you mean that the energy density in a room is the same as the heat flux due to radiation coming out of a black body. They may have a similar form but this doesn't mean they are subject to the same assumptions.. You can determine the assumptions from my explanations in class.

Question by Student 201327139

Professor, I have a question about Assignment #1, Problem 3. I used heat eqs, $\frac{\partial}{\partial t}\left(\int_V \rho c T dV\right) = -\int_S q'' \cdot n dS + \int_V S dV$, $q''_{conv.1} = -q''_{conv.2}$, and $h_1(T_{P_1} - T_{\infty_1}) = h_2(T_{\infty_2} - T_{P_2})$, therefore I found a expression that $T_{P_2} = \frac{20}{3}(80'C - T_{P_1}) + 20'C$. I want to know another eqs for solving T_{P_1}, T_{P_2}. But I can't find it. Where can I get it? Thank you.

Good question. You can get a second equation by applying the heat equation in integral form to one of the plates. Then, you'll have 2 equations for 2 unknowns. 2 points bonus.

Question by Student 201800128

Dear Professor
I have a question about problems that involve mixed heat transfer of radiation and either convection or conduction. In Assignment 1 the expressions of variables come in T_1 and T_1^4. I am not able to find an analytic solution to the problem and therefore turn to numerical methods. I am wondering if it is common to use numerical methods in these problems, such as Newton's Method, or if there is some kind of trick I am not aware of.
Cheers

When you can't find the root to an equation analytically, use a Picard iteration. Thus, let's say we have one equation for one unknown ϕ as follows:

$\phi^4 + \phi^3 + 2\phi = 3000$

Replace one of the ϕ with ϕ_{n+1} and the other ϕs with ϕ_n:

$(\phi_n)^4 + (\phi_n)^3 + 2\phi_{n+1} = 3000$

Then isolate ϕ_{n+1} as a function of ϕ_n. At the first iteration (n=1), set ϕ_1 to a good guess for the root. Then obtain ϕ_2 this way. Once ϕ_2 is known, you can obtain ϕ_3, and so on, until you reach the root. 2 points bonus.

Question by Student 201327106

Dear professor, today, you did not write the assumptions of Temperature Profile

Sketch. Can I know the assumptions?

1D H-T along x, S-S.

Question by Student 201427125

Dear professor professor said that assignment #2, #3, use iterative(?) process, but I didn't complete NUMERICAl ANAlYSIS. So what is iterative process?

You can read about it here:

https://bernardparent.ca/viewtopic.php? ... 6645#p6645