Notes in APPM 4650
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1 Moar on project

conservation in the project: mass $u_x + v_y = 0$, $\delta_v = 0$
x-momentum $uu_x + vu_y = \nu u_{yy}$
Fe energy $uT_x + vT_y = \alpha T_{yy}$
$y \to \infty$ far field.
Similarity Transform to:

$$\eta = \frac{y}{\sqrt{\frac{\nu x}{u_\infty}}}$$

$$\frac{u}{u_\infty} = F'(\eta)$$

$$v = \frac{1}{2}\sqrt{\frac{\nu u_\infty}{x}}(\eta F'(\eta) - F(\eta))$$

$$G = \frac{T - T_\infty}{T_{wall} - T_\infty}$$

$$F''' + \frac{1}{2}FF'' = 0$$

$$G'' + \frac{Pr}{2}FG' = 0$$

boundary conditions from last time.
note that F can be solved without G.
garden hose or shooting technique to get better initial conditions
guess on the slope of F'', solve the problem, see if it matches the value of F' at infinity. Guess again, repeat till it's correct.
wants six figures of accuracy on this. So with your guess, it should give you 1.000000 at the very least.

do the same thing once you have the solution of F.
G has to asymptote to 0.000000.

Want to find η_m such that F' is 0.9700000. Somewhere in G there is a η_T that gives you $G = 0.0300000$.
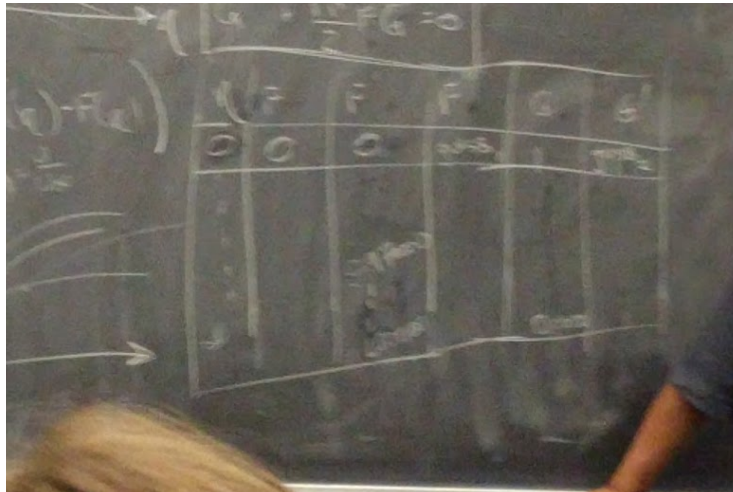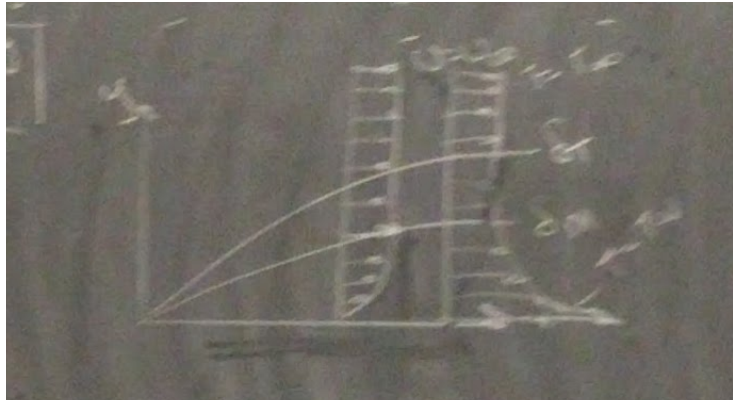
There is a problem because the Prandtl number changes $Pr = \frac{\nu}{\alpha}$.

The η_m stays the same, but η_T changes. He wants a table of these values for the various Prandtl numbers.

Once you get the graph of F' vs η that asymptotes to 1. He wants a graph of $\eta F'(\eta) - F(\eta)$.

If the PR number is 1 than we have two of the same differential equations only with different initial conditions.

At this point $\eta_T = \eta_m$.