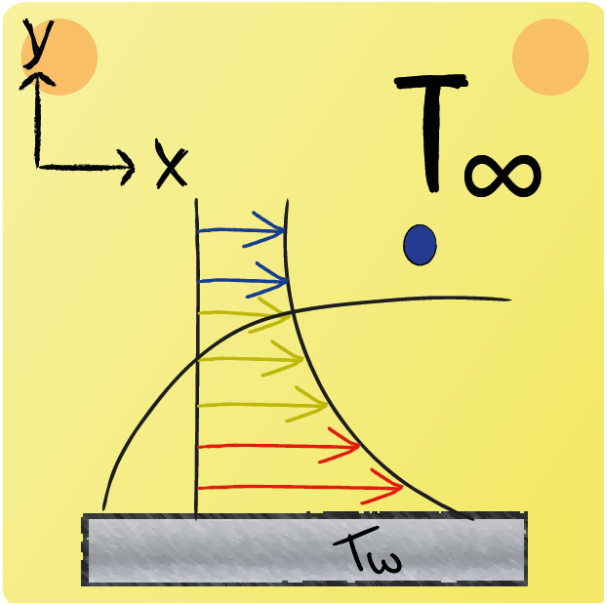
Lecture 2 - Question 5



Is the following statement true or false?

The heat transfer coefficient $\alpha(x)$ is constant for laminar flow along a flat plate. Assume an ideal gas and steady-state heat transfer.

False. As can be seen in the figure, the thickness of a thermal boundary layer δ is not constant along a flat plate. Therefore, $\frac{\partial T}{\partial y}|_{y=0}$ and $\alpha(x)$ are not constant. For that reason the average heat transfer coefficient $\bar{\alpha} = \frac{1}{L}\int_0^L \alpha(x), dx$ is used for simple calculations with flat plates.