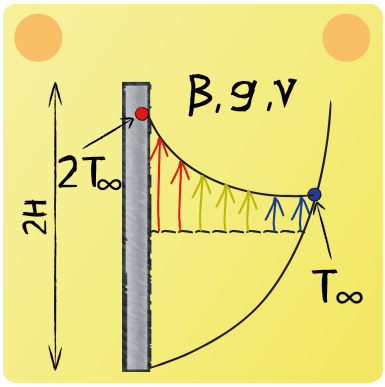
Lecture 3 Question 4

Give an expression for the Grashof number $\mathrm{Gr_L}$ for the given situation in the figure, in terms of known parameters.



The general expression for the Grashof number is $\mathrm{Gr_L} = \frac{\beta g \rho^2 (T_\mathrm{w} - T_\infty) L^3}{\eta^2}$, where the characteristic length for the given case is $L = 2H$, the wall temperature $T_w = 2T_\infty$ and $\nu = \frac{\eta}{\rho}$.
Thus:

$$\mathrm{Gr_L} = \frac{8\beta g T_\infty H^3}{\nu^2}$$