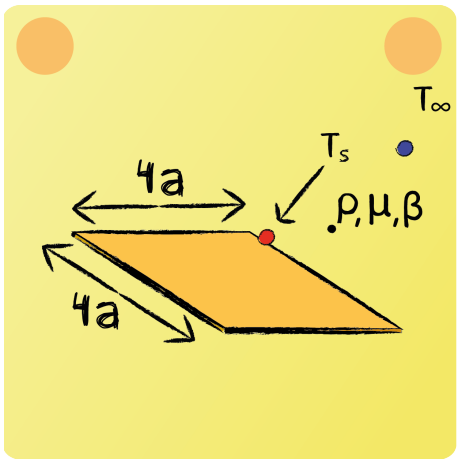
Lecture 04 - Grashof 03

Give an expression for the Grashof number Gr, in terms of the given variables.



Grashof number:

$$\mathrm{Gr} = \frac{g\beta\left(T_\mathrm{s} - T_\infty\right) L_\mathrm{c}^3}{\nu^2}$$

Where the kinematic viscosity can be expressed as:

$$\nu = \frac{\rho}{\mu}$$

And the characteristic length for the sketched situation:

$$L_\mathrm{c} = \frac{A_\mathrm{s}}{p} = \frac{4a \cdot 4a}{4 \cdot 4a} = a$$

So:

$$\mathrm{Gr} = \frac{\rho^2 g\beta\left(T_\mathrm{s} - T_\infty\right) a^3}{\mu^2}$$