Homework problems on Fluid Dynamics

(1.63J/2.21J)

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7-diff-heat.tex

Ex 7. *Differential heating of the water surface.*

Consider a thin layer of fluid of constant (eddy) viscosity. The bottom $y = 0$) is insulated while the top ($y = h$) is kept at the variable temperature

$$T(x, h) = T_o \cos \frac{2\pi x}{L} \tag{1}$$

where $2\pi h/L \ll 1$. Assume that the temperature amplitude T_o is small so that fluid velocity is very low. Find $T(x, y)$ in the layer and the induced current within a spatial period. Discuss the result.