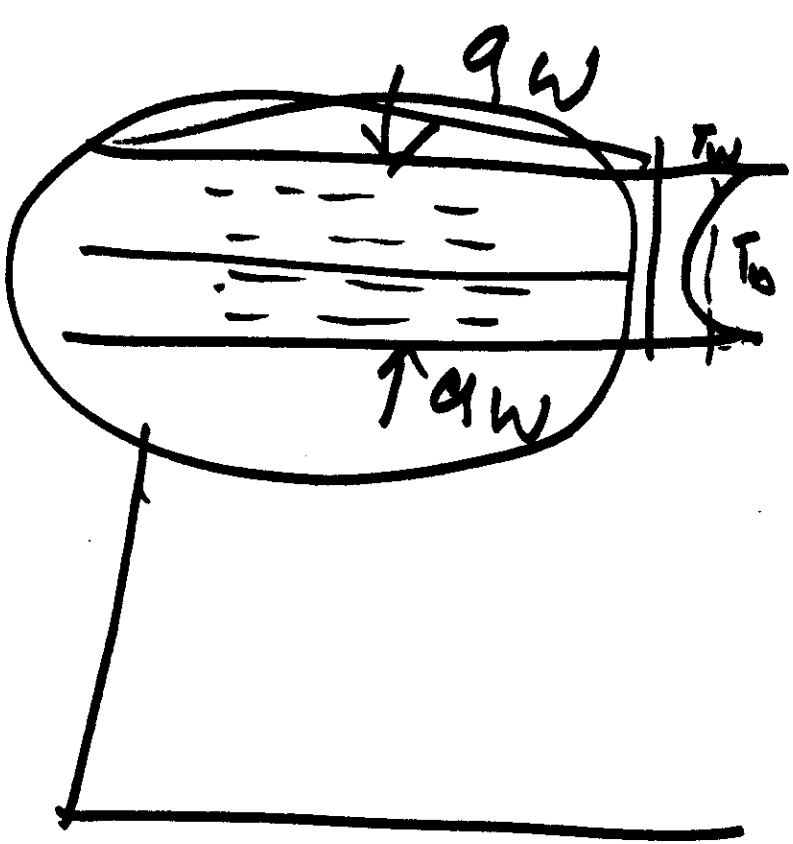
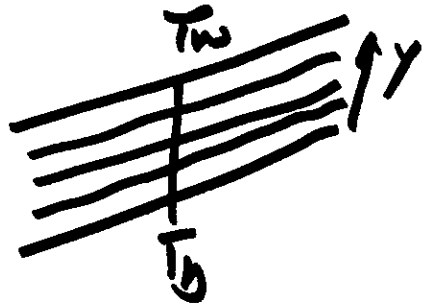
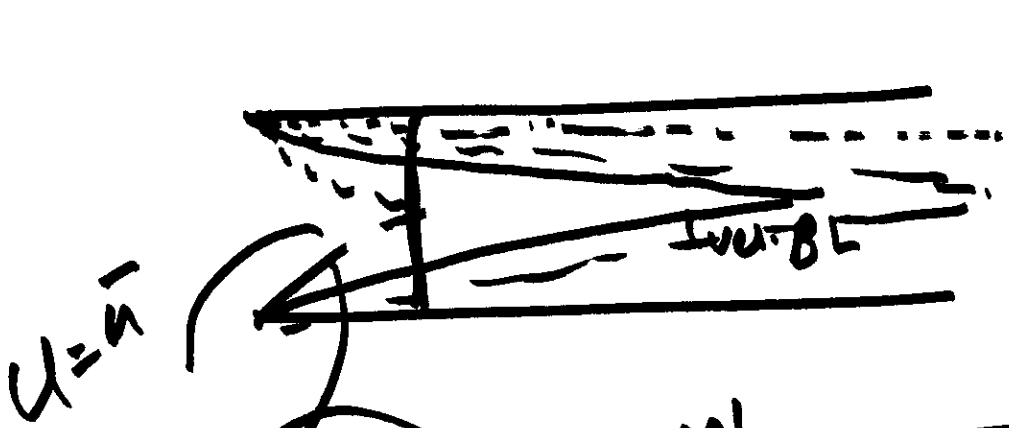
Prof. A.M. Date
Lec. No. 18 & 19
Date: 4/2/11







$Pr >> 1$

(thermal BL $\ll$ velocity BL)

$u = \bar{u}_{fd} = f(r)$

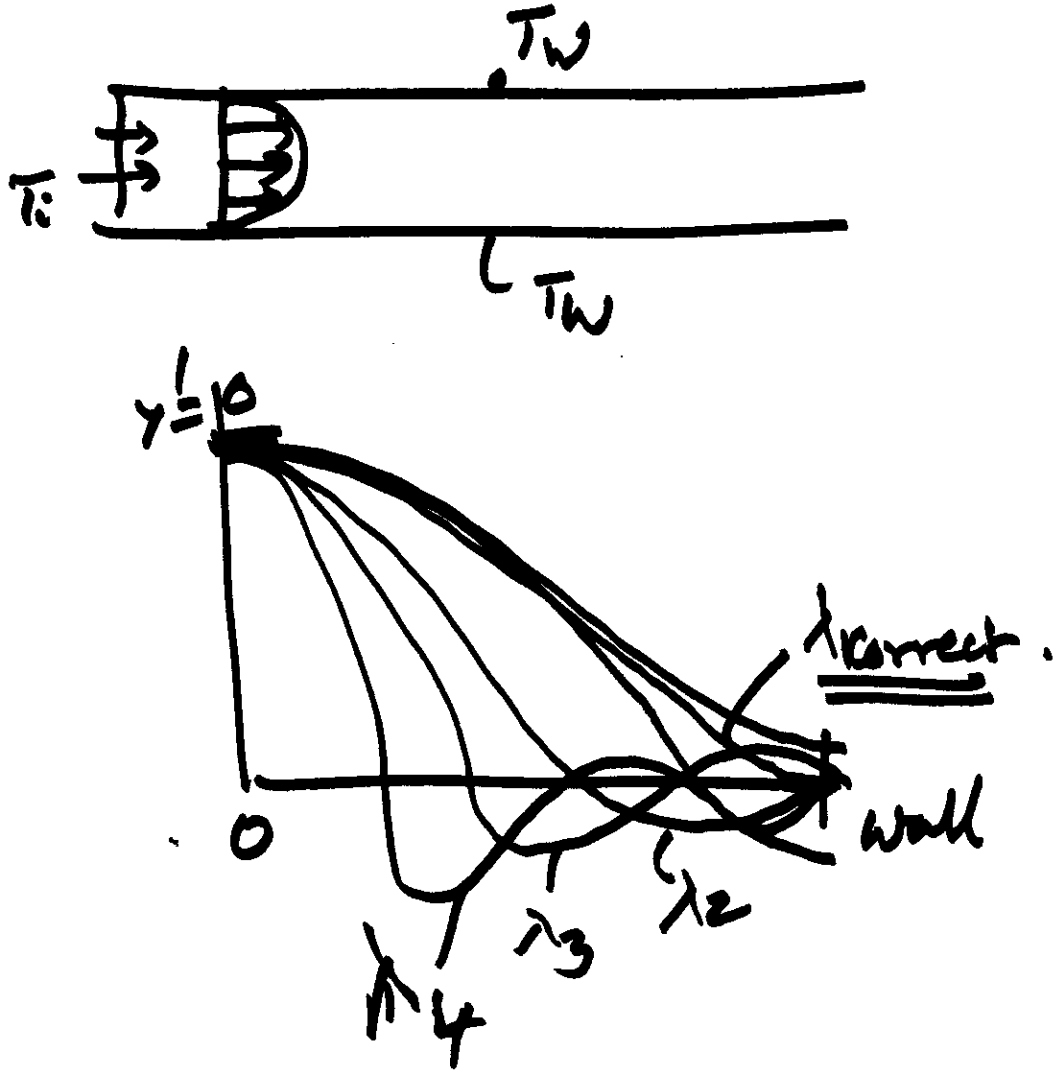
$= 2\bar{u}\left(1 - \frac{r^2}{R^2}\right)$

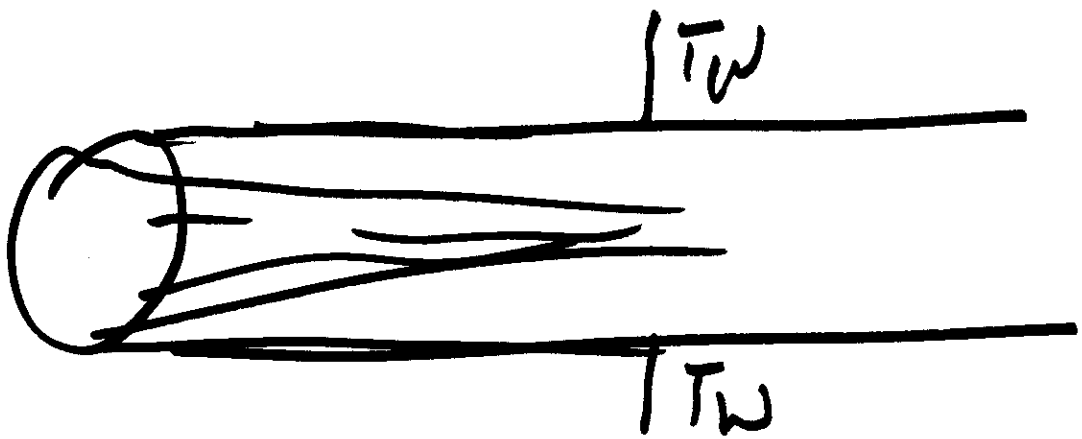
$Pr << 1$ $Pr \leq .001$

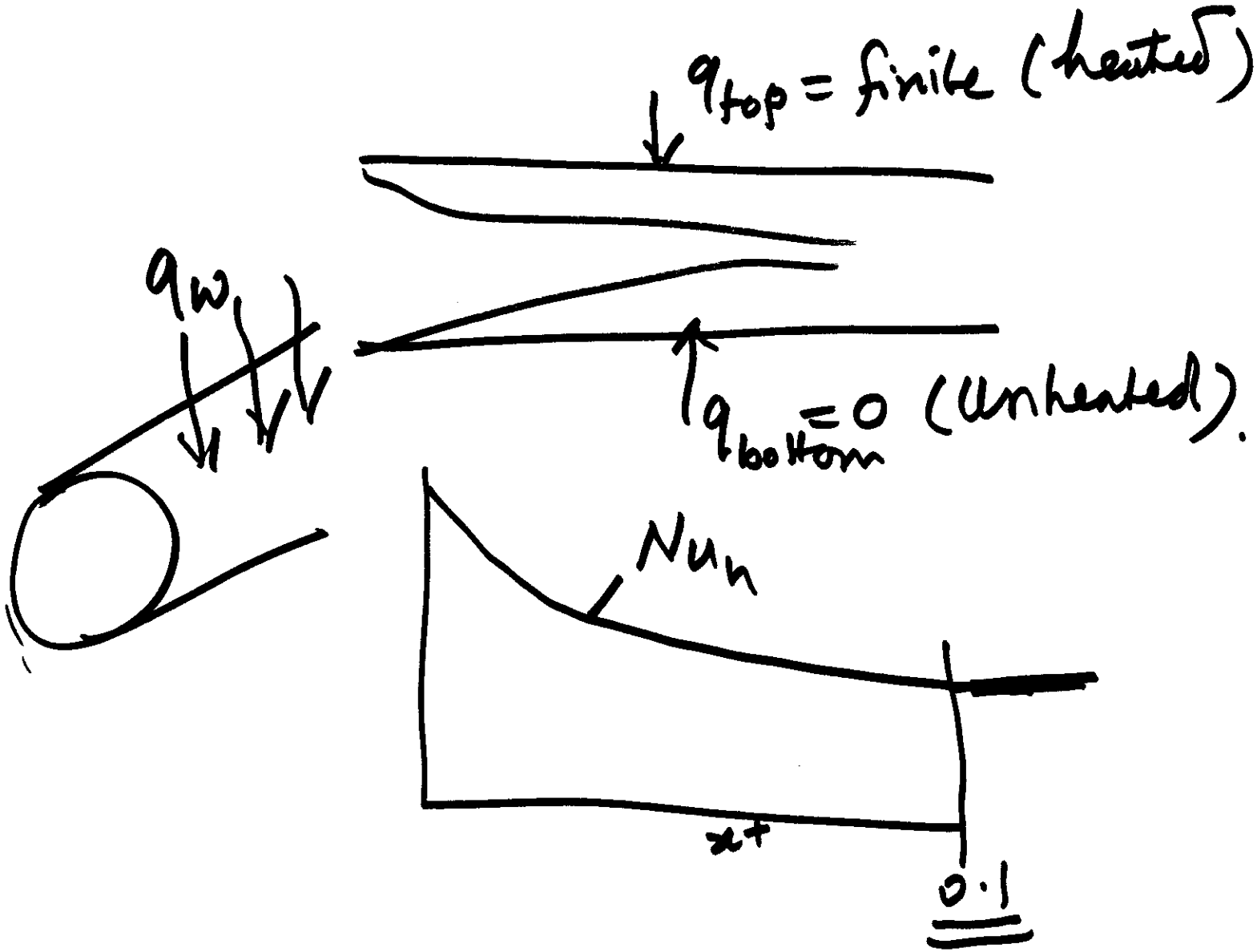
(liquid metals)

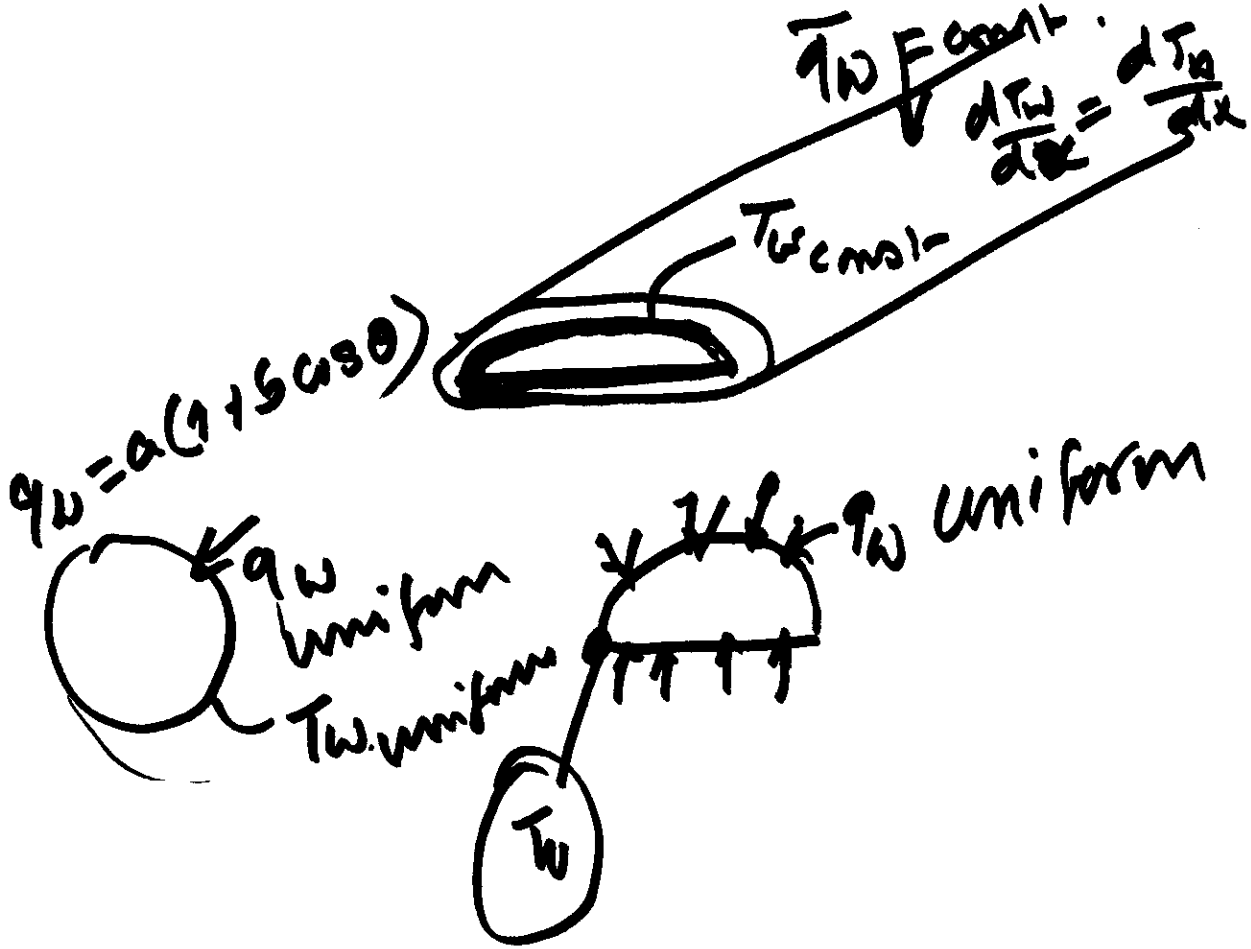
$.5 < Pr < 10$

Simultaneous Dev. of Flow & H.T.


T_w
T_i
T_w
$y=0$
$\lambda_{correct}$
wall
0
λ_3
λ_2
λ_4


T_w
T_w


q_{top} = finite (heated)
q_w
$q_{bottom} = 0$ (Unheated)
Nu_h
x^+
0.1


T_w Forced
$\frac{dT_w}{dx} = \frac{dT_a}{dx}$
T_w const.
$q_w = a(1+\cos\theta)$
q_w uniform
T_w uniform
q_w uniform
T_w

$$\sum c_{tw_i} g_i|_{x_b, y_b} = F_{x_b y_b}$$

LU-decomposition

$\bar{q}_w$

$\vec{n}$

(S)

$T_w = \text{const}$

$\partial T/\partial y$

$\vec{n}$

$\frac{\partial T}{\partial z}$

$$\frac{\partial T}{\partial n} = \underline{\underline{l}} \cdot \frac{\partial T}{\partial z} + \underline{\underline{m}} \cdot \frac{\partial T}{\partial y}$$

$(x+iy)^n$

$$\frac{\partial^2 g_1}{\partial x^2} + \frac{\partial^2 g_1}{\partial y^2} = 0.25\times 2 + 0.25\times 2$$

$$\frac{\partial^2 g_2}{\partial x^2} + \frac{\partial^2 g_2}{\partial y^2} = 1.0 = g_1$$

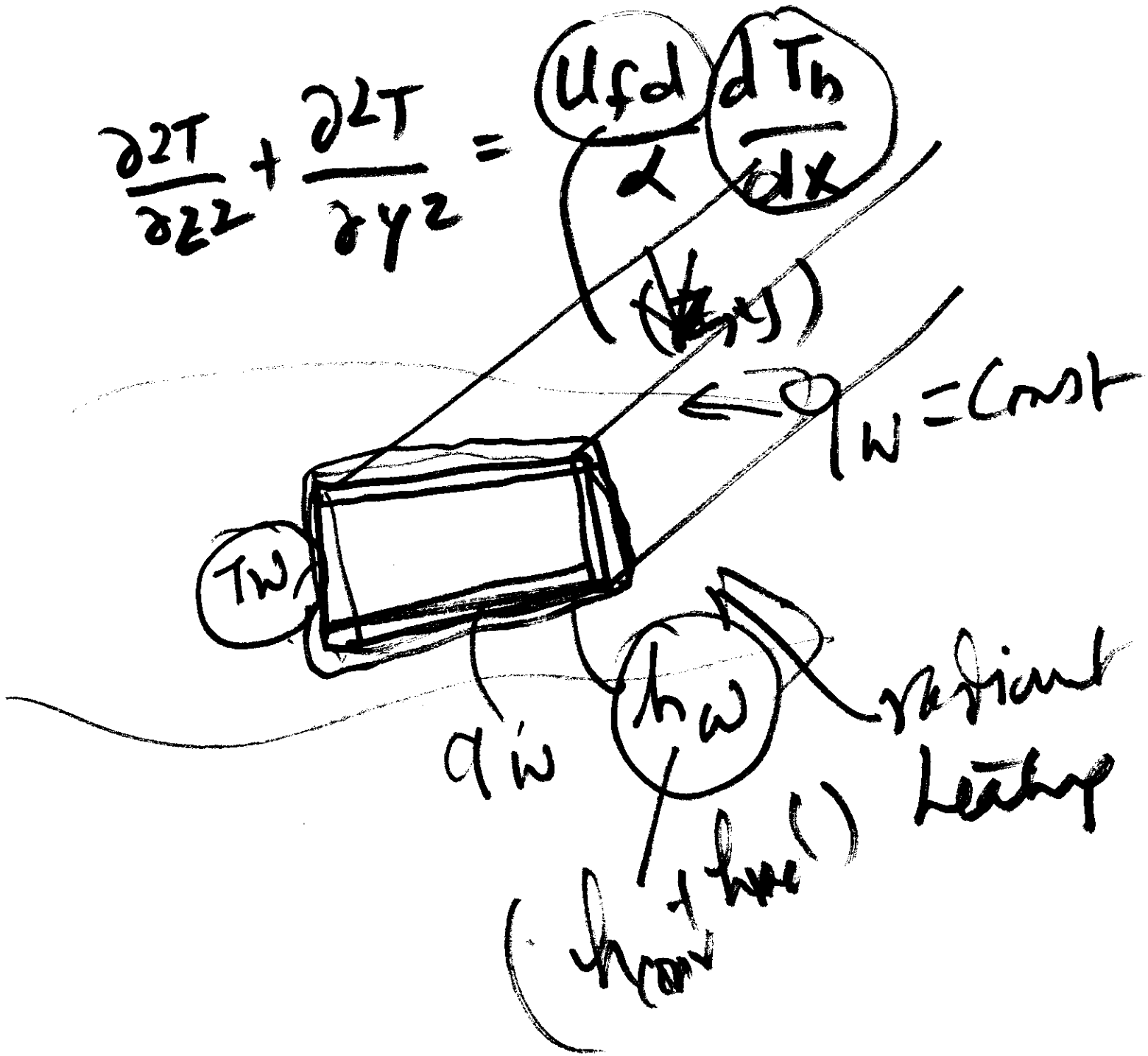
$$= \frac{6x+6x}{12} = \frac{12x}{12} = x = g_2$$

$$\frac{\partial g_2}{\partial x} = \frac{3x^2+3y^2}{12}$$

$$\frac{\partial^2 g_2}{\partial x^2} = \frac{6x}{12}$$

$$\frac{\partial^2 g_2}{\partial y} = \frac{6y}{12}$$

$$\frac{\partial^2 g_2}{\partial y^2} = \frac{6x}{12}$$


$\frac{\partial^2 T}{\partial z^2} + \frac{\partial^2 T}{\partial y^2} = \frac{U_{fd}}{\alpha} \frac{dT_h}{dx}$
$q_w = Const$
T_w
q_w
h_w
radiant
heating
h_{conv}
h_{rad}