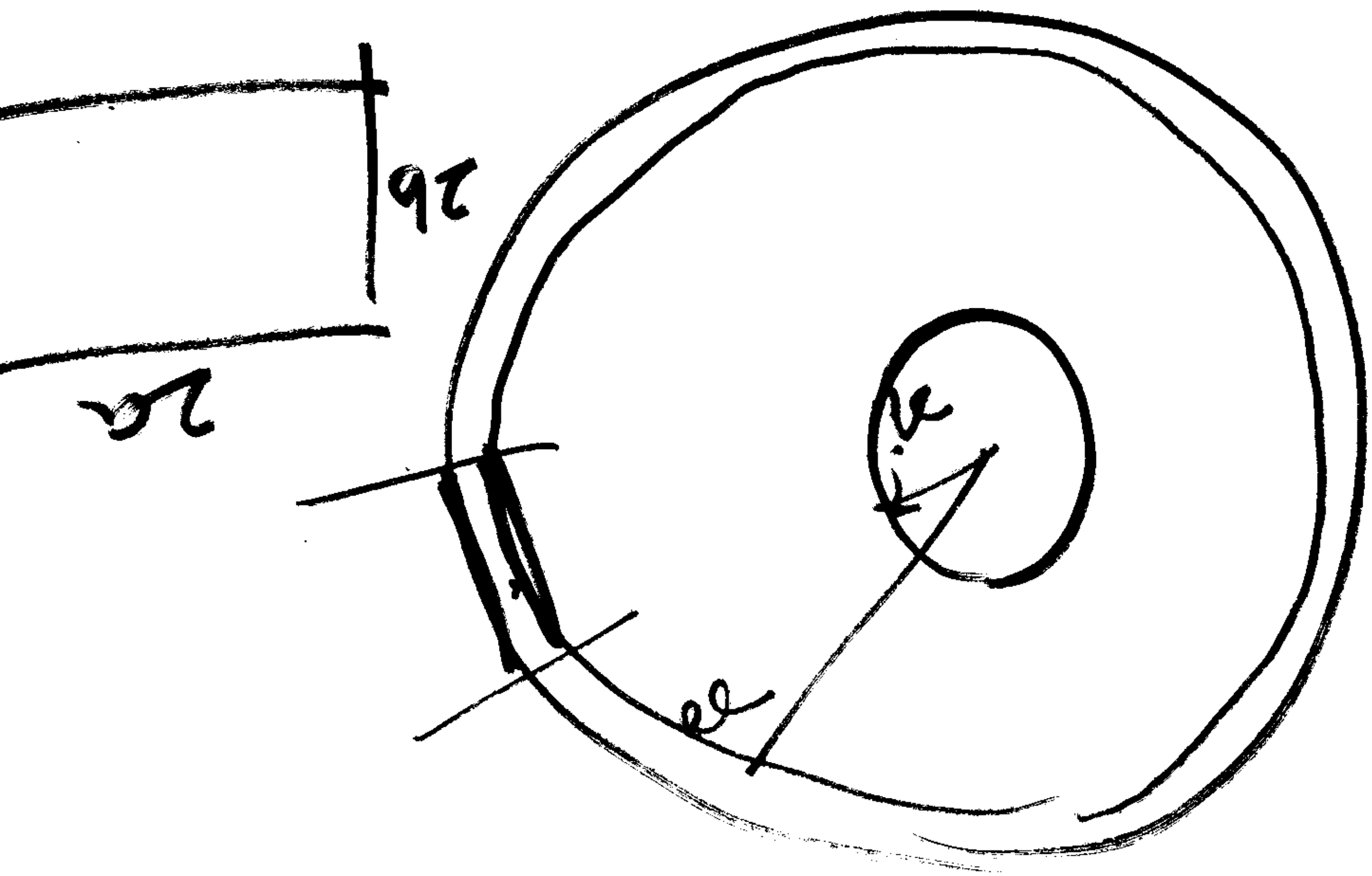
Prof. [illegible] 74
[illegible] 4 -10



$\boxed{f_\ell \quad u_c \quad C_1} \leftarrow \beta$

60

59

$\vdots$

$\downarrow$

0

$F_1$

$F_1(60)$

$F_1(59)$

$F_2$

$F_2(60)$

$F_2(59)$

sum=0

$$\text{sum} = \text{sum} + \frac{F_1(60) - F_1(59)}{\frac{1}{2}(F_2(60) + F_2(59))}$$

$$Re\left[\frac{\partial}{\partial x}(u^*u^*) + \frac{\partial}{\partial y^*}(v^*u^*)\right] = -Re\frac{dp^*}{dx^*} + \frac{\partial^2 u^*}{\partial y^{*2}}$$

$$Re\frac{\partial}{\partial x}\int_0^{1/4} u^*u^*\,dy^* + \overset{0}{\cancel{v^*}}u^*\Big|_{1/4} - u^*\cancel{v^*}\Big|_0^{0}$$

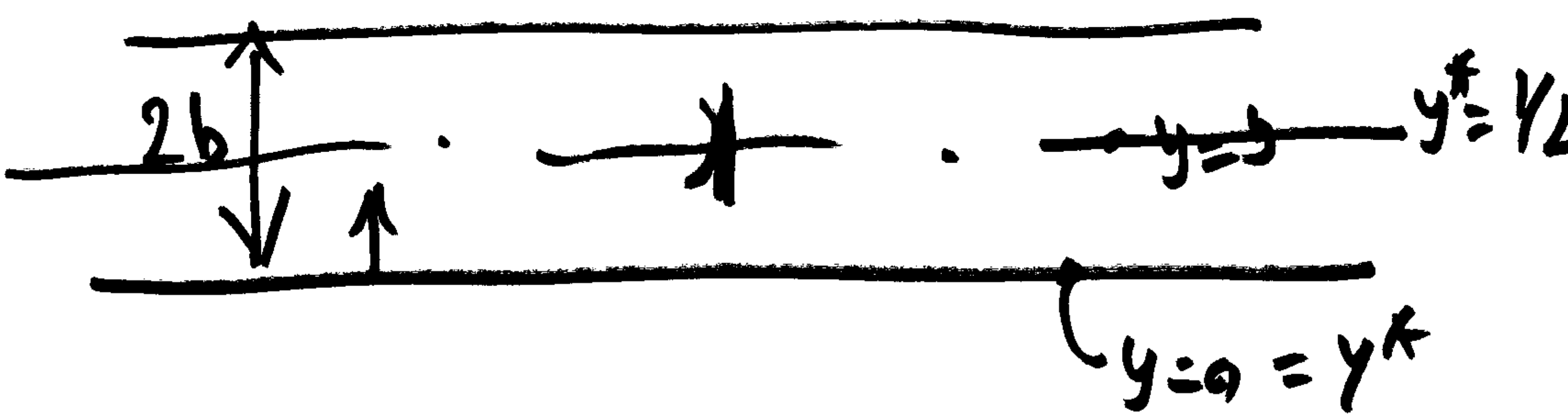
$$= -\frac{Re}{4}\frac{dp^*}{dx^*} + \overset{0}{\cancel{\frac{\partial u^*}{\partial y^*}}}\Big|_{1/4} - \frac{\partial u^*}{\partial y^*}\Big|$$

$$\frac{\partial^2 u^*}{\partial y^{*2}} - \beta^2 u^* = Re \frac{dP^*}{dx^*}$$

$$u' = u^* - \frac{Re}{\beta^2}\frac{dP^*}{dx}$$ f(x) only

$$\boxed{\frac{\partial^2 u'}{\partial y^{*2}} - \beta^2 u' = 0}$$

$D_h = 4b$



$$\bar{u} = \frac{1}{b}\int_0^b u\,dy \qquad \frac{y}{4b} \to y^*$$

$$\bar{u} = \frac{\bar{u}}{\cancel{b}}\cdot 4\cancel{b}\int_0^{1/4} \frac{u}{\bar{u}}\cdot dy^*$$

$$\frac{1}{4} = \int_0^{1/4} \underline{\underline{u}}^*\,dy^*$$

$$= \int_0^{1/4} \left(\underline{\underline{u}}' - \frac{Re}{\beta^2}\frac{dp^*}{dx^*}\right) dy^*$$

$$\frac{dp^*}{dx^*} = \frac{\partial p}{\partial x} \cdot \frac{Dn}{\rho U^2} = 2 f_\ell$$

$$f_\ell = \frac{1}{2} \cdot \left|\frac{dp}{dx}\right| \cdot \frac{Dn}{\rho U^2}$$