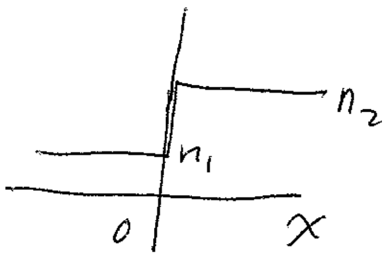
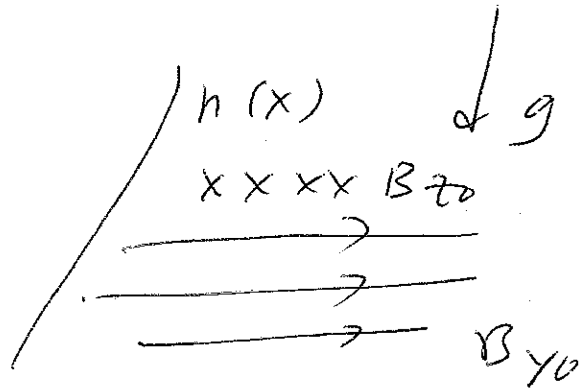
Soln to P7

$n =$ 



$B_z \to \infty \Rightarrow$ Red^d eqns $\longrightarrow \tilde{u}_x n' = \partial_y \tilde{\varphi} n'$

$$\partial_t \tilde{n} + \vec{\tilde{u}} \cdot \vec{\nabla} n = 0$$

$$\partial_t \vec{\nabla} \cdot (nM \vec{\nabla} \tilde{\varphi}) = M \partial_y \tilde{n}\, g + \vec{B} \cdot \vec{\nabla} \nabla_\perp^2 \tilde{\psi}$$

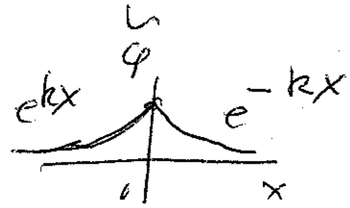
$$\partial_t \tilde{\psi} = \vec{B} \cdot \vec{\nabla} \tilde{\varphi}$$

$$\vec{B} = \hat{z} \times \vec{\nabla} \psi, \quad B_{y0} = \frac{d\psi_0}{dx} \Rightarrow \psi_0 = B_{y0}\, x$$

$\underline{n' = 0} \Rightarrow \tilde{n} = 0$

$(d/dz = 0) \Rightarrow \partial_t \nabla_\perp^2 \tilde{\varphi} = \dfrac{B_{y0}}{nM} \partial_y \nabla_\perp^2 \tilde{\psi}$

$$\partial_t \tilde{\psi} = B_{y0} \partial_y \tilde{\varphi}$$

$e^{iky} \Rightarrow (\omega^2 - k^2 V_{Ay}^2) \nabla_\perp^2 \tilde{\varphi} = 0 \Rightarrow$ 

<u>Jump condition</u> $\quad -i\omega\, \partial_x (nM \partial_x \tilde{\varphi}) \simeq Migk\tilde{n} + B_{y0} ik\, \partial_x^2 \tilde{\psi}$

$$-i\omega \tilde{n} + ik \tilde{\varphi} n' = 0$$

$$\Rightarrow -i\omega\, \partial_x (nM \partial_x \tilde{\varphi}) \simeq -\frac{ik^2 g}{\omega} M n' \tilde{\varphi} + ik B_{y0} \partial_x^2 \tilde{\psi}$$

$$\int_{-\varepsilon}^{\varepsilon} dx \Rightarrow -i\omega\left[nM\partial_x\tilde{\varphi}\right] \simeq -\frac{ik^2 gM}{\omega}[n]\tilde{\varphi} + ikB_{y0}\left[\partial_x\tilde{\psi}\right]$$

$$\text{where } \quad -i\omega\tilde{\psi} = B_{y0}ik\tilde{\varphi}$$

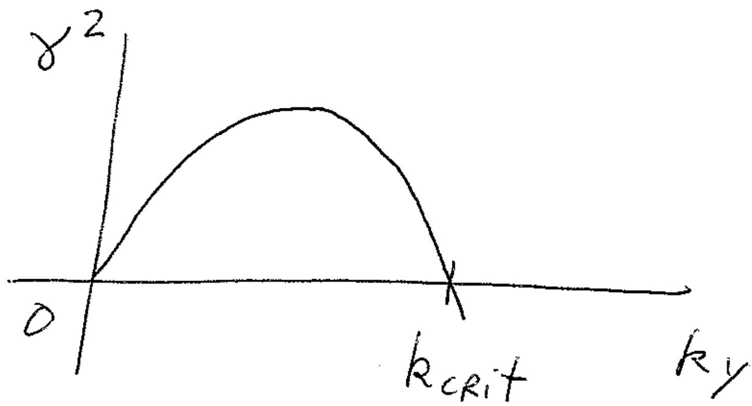
$$\Rightarrow \quad \omega^2\left[nM\partial_x\tilde{\varphi}\right] = Mk^2 g[n]\tilde{\varphi} + k^2B_{y0}^2\left[\partial_x\tilde{\varphi}\right]$$

$$\Rightarrow + \cancel{2k}\,\omega^2 \cancel{M}(n_2+n_1) = -k^{\cancel{2}} g(n_2-n_1) + \frac{\cancel{2}kk^2B_{y0}^2}{\cancel{M}}$$

$$\Rightarrow \boxed{\omega^2 = -kg\frac{(n_2-n_1)}{(n_2+n_1)} + \frac{2k^2B_{y0}^2}{(n_2+n_1)M}}$$

stabilizing

$$\boxed{Mg(n_2-n_1) = 2B_{y0}^2 k_{crit}}$$



parabolic