5.3 $\hat{R}_\beta \to 0$ $\hat{\sigma}_\eta \to 0$

5.109 $\left(\mu_\ell - \frac{\Delta r}{2\rho} + \frac{1}{2} \hat{\nabla}^2 \hat{1} \right) A_\ell(\hat{x})$

$$- i \int d\hat{\rho} \, d\hat{\eta} \int_{-\infty}^{\infty} d\tau \, e^{i(\nu\hat{\partial} - \mu_\ell)\tau} \frac{d\bar{\hat{\rho}}_0}{d\hat{\eta}} A_\ell(\hat{x}+) = 0$$

5.131 + 5.132

$$\frac{1}{2} \left[\frac{1}{\hat{r}} \frac{\partial}{\partial \hat{r}} \left(\hat{r} \frac{\partial}{\partial \hat{r}} \right) + \frac{1}{\hat{r}^2} \frac{\partial}{\partial \phi^2} \right] A_\ell(\hat{x}) + \left[\mu_\ell - \frac{\Delta r}{2\rho} - \left(1 - \frac{\hat{r}^2}{2\hat{\sigma}_x^2} \right) \frac{1}{\mu_\ell^2} \right] A_\ell(\hat{x}) = \emptyset$$

$$A_\ell(\hat{x}) = A_{\ell,m}(\hat{r}) e^{im\phi}, \qquad y = \frac{i\hat{r}^2}{\mu_\ell \hat{\sigma}_x}$$

$$\left[\frac{\partial}{\partial y} \left(y \frac{\partial}{\partial y} \right) - \frac{m^2}{4y} + \frac{\mu_\ell \hat{\sigma}_x}{2i} \left(\mu_\ell - \frac{\Delta r}{2\rho} - \frac{1}{\mu_\ell^2} \right) - \frac{y}{4} \right] A_{\ell,m} = 0$$

$$A_{\ell,m} = y^{m/2} e^{-y/2} \alpha_{\ell,m}(y)$$

$$y \alpha''_{\ell,m}(y) + (1+m-y) \alpha'_{\ell,m}(y) = \frac{1}{2} \left[m+1 + i\mu_\ell \hat{\sigma}_x \left(\mu_\ell - \frac{\Delta r}{2\rho} - \frac{1}{\mu_\ell^2} \right) \right] \alpha_{\ell,m}(y) = 0$$

$$m = 0$$

$$y'' \alpha_{\ell,0}(y) + (1-y) \alpha'_{\ell,0}(y) - \frac{1}{2} \left[1 + i\mu_\ell \hat{\sigma}_x \left(\mu_\ell - \frac{\Delta r}{2\rho} - \frac{1}{\mu_\ell^2} \right) \right] \alpha_{\ell,0}(y) = 0$$

$$\mu_\ell^2 \left(\mu_\ell - \frac{\Delta r}{2\rho} \right) - 1 = \frac{i\mu_\ell}{\hat{\sigma}_x} (2\ell+1)$$

$$\text{as } \hat{\sigma}_x \to \emptyset \implies \mu_\ell^2 \left(\mu_\ell - \frac{\Delta r}{2\rho} \right) = \emptyset$$