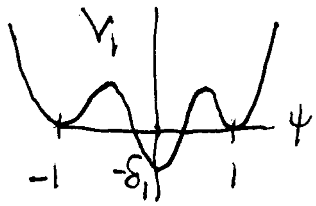
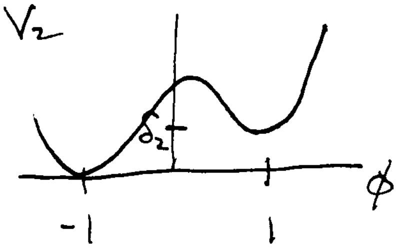
$$\mathcal{L} = \frac{1}{2}(\partial\psi)^2 + \frac{\alpha}{2\beta}(\partial\phi)^2 - \left\{ \underbrace{(\psi^2-\delta_1)(\psi^2-1)^2}_{V_1} + \frac{\alpha}{\psi^2+\gamma}\underbrace{\left[(\phi^2-1)^2 - \frac{\delta_2}{4}(\phi-2)(\phi+1)^2\right]}_{V_2} \right\}$$




Eqs:

$$\boxed{\begin{aligned} &\psi'' - 2\psi(\psi^2-1)(3\psi^2-2\delta_1-1) + 2\psi\frac{\alpha V_2}{(\psi^2+\gamma)^2} = 0 \\ &\phi'' - \frac{\beta}{\psi^2+\gamma}(\phi^2-1)\left(4\phi - \frac{3}{4}\delta_2\right) = 0 \end{aligned}}$$

Look for solns with the following properties:

$\psi$ odd $\therefore$ $\boxed{\psi(0) = 0}$

$\phi$ even $\therefore$ $\boxed{\phi'(0) = 0}$ (presume $\phi(0) \simeq 1$)

As $x \to \infty$ we want $\psi \to 1$, $\phi \to -1$

Find: $$\boxed{\begin{aligned} &\psi' + \sigma_1(\psi-1) = 0, \quad \phi' + \sigma_2(\phi+1) = 0 \\ &\text{where } \sigma_1 = \sqrt{8(1-\delta_1)}, \quad \sigma_2 = \sqrt{\frac{\alpha(16+3\delta_2)}{2\beta(1+\gamma)}} \end{aligned}}$$