Demo

EF

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HELLO

$$\hat{H}\Psi = E\Psi$$

$$\frac{\alpha_c}{2(r^2 + a_l^2)^2}$$

$$\frac{l(l+1)}{2r^2}$$

$$-\frac{1}{r}$$

$$+\frac{1}{h^2}$$

$$-\frac{.5}{h^2}$$

$$\frac{1}{h^2} + V_i$$

$$H = \begin{pmatrix} a_1 & b & 0 & ... & 0 \\ b & a_2 & b & ... & 0 \\ 0 & b & a_3 & ... & 0 \\ .. & ... & ... & ... & 0 \\ 0 & 0 & 0 & b & a_N \end{pmatrix}$$

$$\hat{H}f_l = Ef_l$$

$$\hat{H} = KE + PE$$

$$KE = -\frac{1}{2}\left[\frac{d^2 f_1}{dr^2}\right] \approx -\frac{1}{2h^2}(f_{i+1} - 2f_i + f_{i-1})$$

$$PE = V(r) = \left[\frac{1}{r} + \frac{\alpha_c}{2(r^2 + a_l^2)^2} - \frac{l(l+1)}{2r^2}\right]$$

$$\hat{H} = \left(-\frac{1}{2}\left[\frac{d^2}{dr^2}\right] - \left[\frac{1}{r} + \frac{\alpha_c}{2(r^2 + a_l^2)^2} - \frac{l(l+1)}{2r^2}\right]\right)$$