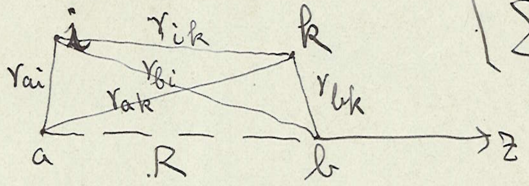

$$\left\{\sum \Delta_i + \frac{8\pi^2 m}{h^2}\left\{E - e^2\left(\frac{Z_a Z_b}{R} - \sum_{k=1}^{Z_a+Z_b}\frac{Z_a}{r_{ai}} - \sum_{k=1}^{Z_a+Z_b}\frac{Z_b}{r_{bk}} + \sum_{i \neq k}\frac{1}{r_{ik}}\right)\right\}\right\}$$

$$\times \Psi = 0$$

$$\left\{\begin{array}{l} {}^{\alpha}\psi_{l'}(1, 2, \dots Z_a) \\ {}^{\beta}\varphi_{l''}(Z_a+1, \dots Z_a+Z_b) \end{array}\right. \qquad {}^{\alpha}\psi_{l'} \cdot {}^{\beta}\varphi_{l''} = u_l(I)$$

$$\Psi = \sum_{R}^{(n+m)!} C_R\, u_{Rl}(R)$$

$$\sum_{i,j=1}^{Z_a}\frac{1}{r_{ij}} \quad - \sum_{k,l=Z_a+1}^{Z_a+Z_b}\frac{1}{r_{kl}}$$

$$\Psi = \Psi_0 + \Psi_1 + \dots$$

$$H_0\Psi_0 = \left[\sum\Delta_i + \frac{8\pi^2 m}{h^2}\left\{E_0 + e^2\left(\sum_{i=1}^{Z_a}\frac{Z_a}{r_{ai}} + \sum_{k=Z_a+1}^{Z_a+Z_b}\frac{Z_b}{r_{bk}}\right)\right\}\right]\Psi_0 = 0$$

$H_0\Psi_0$

$(H_0 H_1)\Psi$

$H_1\Psi_0$

$$\left[\sum\Delta_i + \frac{8\pi^2 m}{h^2}\left\{E_0 + e^2\left(\sum + \sum\right)\right\}\right]\Psi_1 + \frac{8\pi^2 m}{h^2}\left\{E_1 + e^2\left(\sum_{k=Z_a+1}\frac{Z_a}{r_{ak}} + \sum_{i=1}^{Z_a}\frac{Z_b}{r_{bi}}\right.\right.$$

$$\left.\left. - \frac{Z_a Z_b}{R} + \sum_{\substack{i=1 \\ k=Z_a+1}}^{Z_a,\ Z_a+Z_b}\frac{1}{r_{ik}}\right)\right\}\Psi_0 = 0.$$

$$\Psi_0^{r} \qquad \Psi_{01} = \sum_{s=1}^{\infty} a_s \Psi_0^{s}$$

$$\frac{8\pi^2 m}{h^2}(E_{0s} - E_{0r})\, a_s + \frac{8\pi^2 m}{h^2}\left(E_1 \delta_{rs} + V_1^{rs}\right) = 0$$

$$V_1\Psi_0^{r} = V_1^{rs}\cdot\Psi_0^{s}$$

$$a_r = 0.$$

$$a_s = \frac{V_1^{rs}}{E_{0r} - E_{0s}}$$

$$n \qquad \frac{n(n-1)}{2}$$

$$-\frac{1}{2} \qquad \frac{-\frac{1}{2}\cdot-\frac{3}{2}}{2}$$

$$\underline{E_{1r} = V_1^{rr}} = e^2\int\Psi_0^{r}\left(\sum\frac{Z_a}{r_{ak}} + \sum\frac{Z_b}{r_{bi}} - \frac{Z_a Z_b}{R} + \sum\frac{1}{r_{ik}}\right)\Psi_0^{r}\,dv$$

$$\frac{1}{r_{ak}} = \left(R^2 + r_{bk}^2 + 2R r_{bk}\cos\theta_{bk}\right)^{-\frac{1}{2}} = \frac{1}{R}\left(1 - \frac{r_{bk}\cos\theta_{bk}}{R} - \frac{1}{2}\frac{r_{bk}^2 - 3r_{bk}^2\cos^2\theta_{bk}}{R^2} + \dots\right.$$

$$\frac{1}{r_{bi}} = \left(R^2 + r_{ai}^2 - 2R r_{ai}\cos\theta_{ai}\right)^{-\frac{1}{2}} = \frac{1}{R}\left(1 + \frac{r_{ai}\cos\theta_{ai}}{R} - \frac{1}{2}\frac{r_{ai}^2(1 - 3\cos^2\theta_{ai})}{R^2} + \dots\right.$$

$$\frac{1}{r_{ik}} = \left(r_{bk}^2 + r_{bi}^2 - 2 r_{bk} r_{bi}\cos\theta_{bik}\right)^{-\frac{1}{2}}$$

$$= \left(r_{bk}^2 + R^2 + r_{ai}^2 - 2R r_{ai}\cos\theta_{ai} - 2 r_{bk} R\left(1 + \frac{r_{ai}\cos\theta_{ai}}{R}\right)\cos\theta_{bik}\right)^{-\frac{1}{2}}$$

$$= \frac{1}{R}\left\{ 1 + \frac{r_{ai}\cos\theta_{ai}}{R} - \frac{r_{ai}\cos\theta_{bk}}{R} - \frac{1}{2}\frac{(r_{bk}^2 + r_{ai}^2)}{R^2} \right.$$

$$\cos\theta_{bik} = \cos\theta_{bk}\cos\theta_{bi} + \cancel{\cos}\sin\theta_{bk}\sin\theta_{bi}\cos(\varphi_{bk}-\varphi_{bi})$$

$$= \cos\theta_{bk}\cdot 1 + \sin\theta_{bk}\,\cancel{\sin\theta}\,\frac{r_{ai}}{R}\cos(\varphi_{bk}-\varphi_{bi})$$

$$-2r_{bk}R + 2\, r_{bk}r_{ai}(\cos\theta_{ai} -$$

$$r_{bi}\cos\theta_{bik} = -r_{bi}\cos\theta_{bk} + r_{bi}\sin\theta_{bk}\sin\theta_{bi}\cos(\varphi_{bk}-\varphi_{bi})$$

$$= \left(-R + \cancel{\frac{r_{ai}\cos\theta_{ai}}{R}}\right)\cos\theta_{bk} + r_{ai}\sin\theta_{ai}\sin\theta_{bk}\cos(\varphi_{bk}-\varphi_{bi})$$

$$\varphi_{ai}''$$

$$= -R\cos\theta_{bk} + \frac{r_{ai}}{\cancel{R}}(\cos\theta_{ai}\cos\theta_{bk} + \sin\theta_{ai}\sin\theta_{bk}\cos(\varphi_{bk}-\varphi_{ai}))$$

$$\frac{1}{r_{ik}} = \Big(R^2 - 2R(r_{ai}\cos\theta_{ai} - r_{bk}\cos\theta_{bk})$$

$$+ r_{ai}^2 + r_{bk}^2 - 2r_{ai}r_{bk}(\cos\theta_{ai}\cos\theta_{bk} + \sin\theta_{ai} \times \sin\theta_{bk}\cos(\varphi_{bk}-\varphi_{ai})\Big)^{-\frac{1}{2}}$$

$$= \frac{1}{R}\left\{ 1 + \frac{r_{ai}\cos\theta_{ai} - r_{bk}\cos\theta_{bk}}{R} - \frac{1}{2}\frac{1}{R^2}\left\{ r_{ai}^{2(\cdots)} + r_{bk}^{2(\cdots)} \right.\right.$$

$$\left.\left. - 2r_{ai}r_{bk}(\qquad\qquad) + 6\, r_{ai}r_{bk}\cos\theta_{ai}\theta_{bk} \right\}\right\}$$

$$-4\cdot\frac{3}{8}(2r_{ai}\cos\theta_{ai}\, r_{bk}\cos\theta_{bk})$$

$$\sum\frac{\cancel{z_a}}{r_{ak}} + \sum\frac{z_b}{r_{bi}} - \sum\frac{1}{r_{ik}} - \frac{\cancel{z_a}z_b}{R} = \frac{1}{R^3}\sum_{ik} r_{ai}r_{bk}\{2\cos\theta_{ai}\theta_{bk} - \sin\theta_{bk}\sin\theta_{ai}\cos(\varphi_{bk}-\varphi_{ai})\}$$