$$E_L(\mathbf{R};\alpha) = \frac{1}{\Psi(\mathbf{R};\alpha)} H\Psi(\mathbf{R};\alpha) = \frac{1}{\Psi(\mathbf{R};\alpha)}\left[-\frac{\hbar^2}{2m}\boldsymbol{\nabla}^2\Psi(\mathbf{R};\alpha) + V(\mathbf{R})\Psi(\mathbf{R};\alpha)\right]$$

where $\boldsymbol{\nabla}^2 = \sum_i^N \frac{\partial^2}{\partial x_i^2} + \frac{\partial^2}{\partial y_i^2} + \frac{\partial^2}{\partial z_i^2}$

We approximate $\frac{\partial^2\Psi(x_i;\alpha)}{\partial x_i^2} \approx \frac{\Psi(x_i+h) - 2\Psi(x_i) + \Psi(x_i-h)}{h^2}$

$$\boldsymbol{\nabla}^2\Psi_T(\mathbf{R}) = \sum_i^N \frac{\partial^2\Psi_T}{\partial x_i^2} + \frac{\partial^2\Psi_T}{\partial z_i^2} + \frac{\partial^2\Psi_T}{\partial z_i^2}$$

If the wavefunction is separable: $\Psi_T(\mathbf{R}) = \prod_j^N \psi_j(\mathbf{r}_j)$ then

$$\frac{\partial^2\Psi_T}{\partial x_i^2} = \frac{1}{\psi_i(\mathbf{r}_i)}\frac{\partial^2\psi_i(\mathbf{r}_i)}{\partial x_i^2}\prod_j^N \psi_j(\mathbf{r}_j) = \frac{1}{\psi_i(\mathbf{r}_i)}\frac{\partial^2\psi_i(\mathbf{r}_i)}{\partial x_i^2}\Psi_T(\mathbf{R})$$

$$\boldsymbol{\nabla}^2\Psi_T(\mathbf{R}) = \Psi_T(\mathbf{R})\sum_i^N \frac{1}{\psi_i(\mathbf{r}_i)}\left[\frac{\partial^2\psi_i(\mathbf{r}_i)}{\partial x_i^2} + \frac{\partial^2\psi_i(\mathbf{r}_i)}{\partial y_i^2} + \frac{\partial^2\psi_i(\mathbf{r}_i)}{\partial z_i^2}\right]$$

$$\approx \Psi_T(\mathbf{R})\sum_i^N \frac{1}{\psi_i(\mathbf{r}_i)h^2}\{\psi_i(x_i+h) + \psi_i(y_i+h) + \psi_i(z_i+h) + \psi_i(x_i-h) + \psi_i(y_i-h) + \psi_i(z_i-h) -$$

$$= \Psi_T(\mathbf{R})\frac{1}{h^2}\sum_i^N \left\{\frac{\psi_i(x_i+h) + \psi_i(y_i+h) + \psi_i(z_i+h) + \psi_i(x_i-h) + \psi_i(y_i-h) + \psi_i(z_i-h)}{\psi_i(\mathbf{r}_i)} - 6\right\}$$

Thus the kinetic energy contribution to the local energy is

$$-\frac{\hbar^2}{2m}\cdot\frac{1}{h^2}\sum_i^N \left\{\frac{\psi_i(x_i+h) + \psi_i(y_i+h) + \psi_i(z_i+h) + \psi_i(x_i-h) + \psi_i(y_i-h) + \psi_i(z_i-h)}{\psi_i(\mathbf{r}_i)} - 6\right\}$$