$$\Psi_T(\boldsymbol{r}_1, \boldsymbol{r}_2) = Ce^{O_\alpha}e^{O_\beta} \tag{1}$$

$$\nabla\Psi_T(\boldsymbol{r}_1, \boldsymbol{r}_2) = -C\alpha\omega e^{O_\alpha}e^{O_\beta}(r_1 + r_2) \tag{2}$$

$$\nabla^2\Psi_T(\boldsymbol{r}_1, \boldsymbol{r}_2) = C\left(\sum_{i=1}^{2}\alpha\omega r_i(\alpha\omega r_i - 1)e^{O_\alpha}e^{O_\beta}\right) \tag{3}$$

$$\frac{\nabla^2\Psi_T(\boldsymbol{r}_1, \boldsymbol{r}_2)}{\Psi_T(\boldsymbol{r}_1, \boldsymbol{r}_2)} = \sum_{i=1}^{2}\alpha\omega r_i(\alpha\omega r_i - 1) \tag{4}$$

where $r_i = \sqrt{r_{ix}^2 + r_{iy}^2}$, $r_{ij} = |\boldsymbol{r}_i - \boldsymbol{r}_j|$,
$e^{O_\alpha} = -\alpha\omega(r_1^2 + r_2^2)/2$,
$e^{O_\beta} = ar_{12}/(1 + \beta r_{12})$.