

$$\frac{\alpha\left(-\frac{R_1}{2}+\frac{R_2}{2}\right)}{r_{12}(\beta r_{12}+1)^2}+\frac{\beta}{2(\beta r_{12}+1)^3}-\frac{1}{2r_{12}(\beta r_{12}+1)^2}-\frac{-2\mathbf{R_{12}}+r_1^2+r_2^2}{8r_{12}^2(\beta r_{12}+1)^4}$$