$$-\frac{e^{-\frac{r_{12}}{4\beta r_{12}+4}-\frac{r_{13}}{2\beta r_{13}+2}-\frac{r_{14}}{2\beta r_{14}+2}-\frac{r_{23}}{2\beta r_{23}+2}-\frac{r_{24}}{2\beta r_{24}+2}-\frac{r_{34}}{4\beta r_{34}+4}}}{2\left(-\left(-\frac{\alpha r_1}{2}+1\right)e^{-\frac{\alpha r_1}{2}}e^{-\alpha r_2}+\left(-\frac{\alpha r_2}{2}+1\right)e^{-\alpha r_1}e^{-\frac{\alpha r_2}{2}}\right)\left(-\left(-\frac{\alpha r_3}{2}+1\right)e^{-\frac{\alpha r_3}{2}}e^{-\alpha r_4}+\left(-\frac{\alpha r_4}{2}+1\right)e^{-\alpha r_3}e^{-\frac{\alpha r_4}{2}}\right)}\left(\left(-\left(-\frac{\alpha r_1}{2}+1\right)e^{-\frac{\alpha r_1}{2}}e^{-\alpha r_2}+\left(-\frac{\alpha r_2}{2}+1\right)e^{-\alpha r_1}e^{-\frac{\alpha r_2}{2}}\right)\left(-\left(-\frac{\alpha r_3}{2}+1\right)e^{-\frac{\alpha r_3}{2}}e^{-\alpha r_4}+\left(-\frac{\alpha r_4}{2}+1\right)e^{-\alpha r_3}e^{-\frac{\alpha r_4}{2}}\right)\left(\frac{\beta^2(x_1-x_4)^2}{r_{14}(\beta r_{14}+1)^3}+\frac{\beta^2(y_1-y_4)^2}{r_{14}(\beta r_{14}+1)^3}+\frac{\beta^2(z_1-z_4)^2}{r_{14}(\beta r_{14}+1)^3}+\frac{\beta^2(x_1-x_3)^2}{r_{13}(\beta r_{13}+1)^3}\right.\right.$$

$$\frac{e^{-\frac{r_{12}}{4\beta r_{12}+4}-\frac{r_{13}}{2\beta r_{13}+2}-\frac{r_{14}}{2\beta r_{14}+2}-\frac{r_{23}}{2\beta r_{23}+2}-\frac{r_{24}}{2\beta r_{24}+2}-\frac{r_{34}}{4\beta r_{34}+4}}}{2\left(-\left(-\frac{\alpha r_1}{2}+1\right)e^{-\frac{\alpha r_1}{2}}e^{-\alpha r_2}+\left(-\frac{\alpha r_2}{2}+1\right)e^{-\alpha r_1}e^{-\frac{\alpha r_2}{2}}\right)\left(-\left(-\frac{\alpha r_3}{2}+1\right)e^{-\frac{\alpha r_3}{2}}e^{-\alpha r_4}+\left(-\frac{\alpha r_4}{2}+1\right)e^{-\alpha r_3}e^{-\frac{\alpha r_4}{2}}\right)}\left(\left(-\left(-\frac{\alpha r_1}{2}+1\right)e^{-\frac{\alpha r_1}{2}}e^{-\alpha r_2}+\left(-\frac{\alpha r_2}{2}+1\right)e^{-\alpha r_1}e^{-\frac{\alpha r_2}{2}}\right)\left(-\left(-\frac{\alpha r_3}{2}+1\right)e^{-\frac{\alpha r_3}{2}}e^{-\alpha r_4}+\left(-\frac{\alpha r_4}{2}+1\right)e^{-\alpha r_3}e^{-\frac{\alpha r_4}{2}}\right)\left(\frac{\beta^2(x_2-x_4)^2}{r_{24}(\beta r_{24}+1)^3}+\frac{\beta^2(y_2-y_4)^2}{r_{24}(\beta r_{24}+1)^3}+\frac{\beta^2(z_2-z_4)^2}{r_{24}(\beta r_{24}+1)^3}+\frac{\beta^2(x_2-x_3)^2}{r_{23}(\beta r_{23}+1)^3}+\frac{\beta^2(\right.\right.$$

$$\frac{e^{-\frac{r_{12}}{4\beta r_{12}+4}-\frac{r_{13}}{2\beta r_{13}+2}-\frac{r_{14}}{2\beta r_{14}+2}-\frac{r_{23}}{2\beta r_{23}+2}-\frac{r_{24}}{2\beta r_{24}+2}-\frac{r_{34}}{4\beta r_{34}+4}}}{2\left(-\left(-\frac{\alpha r_1}{2}+1\right)e^{-\frac{\alpha r_1}{2}}e^{-\alpha r_2}+\left(-\frac{\alpha r_2}{2}+1\right)e^{-\alpha r_1}e^{-\frac{\alpha r_2}{2}}\right)\left(-\left(-\frac{\alpha r_3}{2}+1\right)e^{-\frac{\alpha r_3}{2}}e^{-\alpha r_4}+\left(-\frac{\alpha r_4}{2}+1\right)e^{-\alpha r_3}e^{-\frac{\alpha r_4}{2}}\right)}\left(\left(-\left(-\frac{\alpha r_1}{2}+1\right)e^{-\frac{\alpha r_1}{2}}e^{-\alpha r_2}+\left(-\frac{\alpha r_2}{2}+1\right)e^{-\alpha r_1}e^{-\frac{\alpha r_2}{2}}\right)\left(-\left(-\frac{\alpha r_3}{2}+1\right)e^{-\frac{\alpha r_3}{2}}e^{-\alpha r_4}+\left(-\frac{\alpha r_4}{2}+1\right)e^{-\alpha r_3}e^{-\frac{\alpha r_4}{2}}\right)\left(\frac{\beta^2(-x_3+x_4)^2}{2r_{34}(\beta r_{34}+1)^3}+\frac{\beta^2(-y_3+y_4)^2}{2r_{34}(\beta r_{34}+1)^3}+\frac{\beta^2(-z_3+z_4)^2}{2r_{34}(\beta r_{34}+1)^3}+\frac{\beta^2(-x_2+x_4)^2}{r_{24}(\beta r_{24}+1)^3}+\frac{\beta^2}{r_2}\right.\right.$$

$$\frac{e^{-\frac{r_{12}}{4\beta r_{12}+4}-\frac{r_{13}}{2\beta r_{13}+2}-\frac{r_{14}}{2\beta r_{14}+2}-\frac{r_{23}}{2\beta r_{23}+2}-\frac{r_{24}}{2\beta r_{24}+2}-\frac{r_{34}}{4\beta r_{34}+4}}}{2\left(-\left(-\frac{\alpha r_1}{2}+1\right)e^{-\frac{\alpha r_1}{2}}e^{-\alpha r_2}+\left(-\frac{\alpha r_2}{2}+1\right)e^{-\alpha r_1}e^{-\frac{\alpha r_2}{2}}\right)\left(-\left(-\frac{\alpha r_3}{2}+1\right)e^{-\frac{\alpha r_3}{2}}e^{-\alpha r_4}+\left(-\frac{\alpha r_4}{2}+1\right)e^{-\alpha r_3}e^{-\frac{\alpha r_4}{2}}\right)}\left(\left(-\left(-\frac{\alpha r_1}{2}+1\right)e^{-\frac{\alpha r_1}{2}}e^{-\alpha r_2}+\left(-\frac{\alpha r_2}{2}+1\right)e^{-\alpha r_1}e^{-\frac{\alpha r_2}{2}}\right)\left(-\left(-\frac{\alpha r_3}{2}+1\right)e^{-\frac{\alpha r_3}{2}}e^{-\alpha r_4}+\left(-\frac{\alpha r_4}{2}+1\right)e^{-\alpha r_3}e^{-\frac{\alpha r_4}{2}}\right)\left(\frac{\beta^2(x_3-x_4)^2}{2r_{34}(\beta r_{34}+1)^3}+\frac{\beta^2(y_3-y_4)^2}{2r_{34}(\beta r_{34}+1)^3}+\frac{\beta^2(z_3-z_4)^2}{2r_{34}(\beta r_{34}+1)^3}+\frac{\beta^2(-x_2+x_3)^2}{r_{23}(\beta r_{23}+1)^3}+\frac{\beta^2}{r_2}\right.\right.$$

$$\frac{1}{r_{34}}+\frac{1}{r_{24}}+\frac{1}{r_{23}}+\frac{1}{r_{14}}+\frac{1}{r_{13}}+\frac{1}{r_{12}}-\frac{4}{r_4}-\frac{4}{r_3}-\frac{4}{r_2}-\frac{4}{r_1}$$