Out[439]//TraditionalForm=

$$\frac{7\,e^{i\beta\omega_1}\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{4\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{2\,e^{i\beta\omega_1}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{7\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{4\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{2\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{7\,e^{i\beta\omega_1}\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{4\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{2\,e^{i\beta\omega_1}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{7\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{4\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{2\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{7\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{4\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{2\,e^{-i\beta\omega_3}\cosh(U\beta)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{7\,e^{-i\beta\omega_3}\cosh\left(\frac{U\beta}{2}\right)\cosh(U\beta)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{4\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{2\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\tanh\left(\frac{U\beta}{4}\right)U^3}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{2\,e^{-i\beta\omega_3}\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh(U\beta)\,\omega_3\tanh\left(\frac{U\beta}{4}\right)U^2}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,e^{-i\beta\omega_3}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh(U\beta)\,\omega_3\tanh\left(\frac{U\beta}{4}\right)U^2}{4\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{4\,e^{i\beta\omega_1}\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{U\beta}{2}\right)\omega_1\tanh\left(\frac{U\beta}{4}\right)U^2}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{iU}{2}\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\,e^{i\beta\omega_1}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{U\beta}{2}\right)\omega_1\tanh\left(\frac{U\beta}{4}\right)U^2}{2\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{iU}{2}\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{4\,e^{i\beta\omega_1}\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{U\beta}{2}\right)\omega_1\tanh\left(\frac{U\beta}{4}\right)U^2}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{iU}{2}\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,e^{i\beta\omega_1}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{U\beta}{2}\right)\omega_1\tanh\left(\frac{U\beta}{4}\right)U^2}{2\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{iU}{2}\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{4\,i\,e^{-i\beta\omega_3}\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh(U\beta)\,\omega_2\tanh\left(\frac{U\beta}{4}\right)U^2}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,i\,e^{-i\beta\omega_3}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh(U\beta)\,\omega_2\tanh\left(\frac{U\beta}{4}\right)U^2}{2\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{7\,i\,e^{i\beta\omega_1}\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,U^2}{4\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{2\,i\,e^{i\beta\omega_1}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,U^2}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{7\,i\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,U^2}{4\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{2\,i\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,U^2}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{21\,i\,e^{i\beta\omega_1}\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{4\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{6\,i\,e^{i\beta\omega_1}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{21\,i\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{4\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{6\,i\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{7\,i\,e^{i\beta\omega_1}\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{2\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{4\,i\,e^{i\beta\omega_1}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{7\,i\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{2\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{4\,i\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{7\,i\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{2\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{4\,i\,e^{-i\beta\omega_3}\cosh(U\,\beta)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{7\,i\,e^{-i\beta\omega_3}\cosh\left(\frac{U\beta}{2}\right)\cosh(U\,\beta)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{2\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{4\,i\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\,U^2}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)\,(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{7\,i\,e^{i\beta\omega_1}\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)U^2}{4\,\omega_1\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{2\,i\,e^{i\beta\omega_1}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)U^2}{\omega_1\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,i\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)U^2}{4\,\omega_1\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{2\,i\operatorname{sech}^2\left(\frac{U\beta}{4}\right)U^2}{\omega_1\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,e^{i\beta\omega_1}\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3^2\tanh\left(\frac{U\beta}{4}\right)U}{2\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{4\,e^{i\beta\omega_1}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3^2\tanh\left(\frac{U\beta}{4}\right)U}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3^2\tanh\left(\frac{U\beta}{4}\right)U}{2\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{4\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3^2\tanh\left(\frac{U\beta}{4}\right)U}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,e^{i\beta\omega_1}\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\beta}{4}\right)U}{2\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{4\,e^{i\beta\omega_1}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\beta}{4}\right)U}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\beta}{4}\right)U}{2\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{4\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\beta}{4}\right)U}{\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,e^{i\beta\omega_1}\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\tanh\left(\frac{U\beta}{4}\right)U}{2\,\omega_1\left(\omega_1-\frac{iU}{2}\right)\left(\frac{iU}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{4\,e^{i\,\beta\,\omega_1}\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_3\tanh\left(\frac{U\,\beta}{4}\right)U}{\omega_1\left(\omega_1-\frac{i\,U}{2}\right)\left(\frac{i\,U}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_3\tanh\left(\frac{U\,\beta}{4}\right)U}{2\,\omega_1\left(\omega_1-\frac{i\,U}{2}\right)\left(\frac{i\,U}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{4\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_3\tanh\left(\frac{U\,\beta}{4}\right)U}{\omega_1\left(\omega_1-\frac{i\,U}{2}\right)\left(\frac{i\,U}{2}+\omega_1\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,i\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\,\beta}{4}\right)U}{2\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{4\,i\,e^{-i\,\beta\,\omega_3}\cosh(U\,\beta)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\,\beta}{4}\right)U}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\,i\,e^{-i\,\beta\,\omega_3}\cosh\left(\frac{U\,\beta}{2}\right)\cosh(U\,\beta)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\,\beta}{4}\right)U}{2\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{4\,i\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\,\beta}{4}\right)U}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\cosh^2\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\tanh\left(\frac{U\,\beta}{4}\right)U}{2\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{19\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\tanh\left(\frac{U\,\beta}{4}\right)U}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\cosh\left(\frac{U\,\beta}{2}\right)\cosh\left(\frac{3\,U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\tanh\left(\frac{U\,\beta}{4}\right)U}{6\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{4\cosh\left(\frac{3\,U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\tanh\left(\frac{U\,\beta}{4}\right)U}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{8\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\tanh\left(\frac{U\,\beta}{4}\right)U}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{4\,e^{-i\,\beta\,\omega_3}\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\tanh\left(\frac{U\,\beta}{4}\right)U}{\left(\frac{U^2}{4}+\omega_2^2\right)\omega_3\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{7\,e^{-i\,\beta\,\omega_3}\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\tanh\left(\frac{U\,\beta}{4}\right)U}{2\left(\frac{U^2}{4}+\omega_2^2\right)\omega_3\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\tanh\left(\frac{U\,\beta}{4}\right)U}{2\left(\frac{U^2}{4}+\omega_2^2\right)\omega_3\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{4\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\tanh\left(\frac{U\,\beta}{4}\right)U}{\left(\frac{U^2}{4}+\omega_2^2\right)\omega_3\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{4\,i\,e^{-i\,\beta\,\omega_3}\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh(U\,\beta)\,\omega_3^2\,U}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,i\,e^{-i\,\beta\,\omega_3}\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh(U\,\beta)\,\omega_3^2\,U}{2\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{4\,i\,e^{i\,\beta\,\omega_1}\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_1\,\omega_2\,U}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\,i\,e^{i\,\beta\,\omega_1}\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_1\,\omega_2\,U}{2\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{12\,i\,e^{i\,\beta\,\omega_1}\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_1\,\omega_3\,U}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{21\,i\,e^{i\,\beta\,\omega_1}\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_1\,\omega_3\,U}{2\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{8\,i\,e^{i\,\beta\,\omega_1}\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_1\,\omega_3\,U}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,i\,e^{i\,\beta\,\omega_1}\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_1\,\omega_3\,U}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{8\,e^{-i\,\beta\,\omega_3}\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh(U\,\beta)\,\omega_2\,\omega_3\,U}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\,e^{-i\,\beta\,\omega_3}\cosh\left(\frac{U\,\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh(U\,\beta)\,\omega_2\,\omega_3\,U}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(i\,U-\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{4\,i\,e^{i\,\beta\,\omega_1}\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)U}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\,i\,e^{i\,\beta\,\omega_1}\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)U}{2\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)U}{2\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{4\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)U}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{3\,U\,\beta}{2}\right)U}{6\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{4\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{3\,U\,\beta}{2}\right)U}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{8\,e^{i\,\beta\,\omega_1}\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_1\,\omega_3^2\tanh\left(\frac{U\,\beta}{4}\right)}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,e^{i\,\beta\,\omega_1}\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_1\,\omega_3^2\tanh\left(\frac{U\,\beta}{4}\right)}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{7\,i\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_2\tanh\left(\frac{U\,\beta}{4}\right)}{2\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{4\,i\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_2\tanh\left(\frac{U\,\beta}{4}\right)}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{7\,i\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{3\,U\,\beta}{2}\right)\omega_2\tanh\left(\frac{U\,\beta}{4}\right)}{6\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{4\,i\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{3\,U\,\beta}{2}\right)\omega_2\tanh\left(\frac{U\,\beta}{4}\right)}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{8\,e^{i\,\beta\,\omega_1}\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_1\,\omega_2\,\omega_3\tanh\left(\frac{U\,\beta}{4}\right)}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,e^{i\,\beta\,\omega_1}\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_1\,\omega_2\,\omega_3\tanh\left(\frac{U\,\beta}{4}\right)}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{8\,e^{i\,\beta\,\omega_1}\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_3\tanh\left(\frac{U\,\beta}{4}\right)}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,e^{i\,\beta\,\omega_1}\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_3\tanh\left(\frac{U\,\beta}{4}\right)}{\left(i\,\omega_1-\frac{U}{2}\right)\left(\omega_1-\frac{i\,U}{2}\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{21\,i\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_3\tanh\left(\frac{U\,\beta}{4}\right)}{2\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{12\,i\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{U\,\beta}{2}\right)\omega_3\tanh\left(\frac{U\,\beta}{4}\right)}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{7\,i\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{3\,U\,\beta}{2}\right)\omega_3\tanh\left(\frac{U\,\beta}{4}\right)}{2\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{4\,i\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\sinh\left(\frac{3\,U\,\beta}{2}\right)\omega_3\tanh\left(\frac{U\,\beta}{4}\right)}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{7\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\,\omega_3^2}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{8\,e^{-i\,\beta\,\omega_3}\cosh(U\,\beta)\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\,\omega_3^2}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{7\,e^{-i\,\beta\,\omega_3}\cosh\left(\frac{U\,\beta}{2}\right)\cosh(U\,\beta)\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\,\omega_3^2}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{8\,\text{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2\,\omega_3^2}{\left(\frac{U^2}{4}+\omega_2^2\right)(-i\,U-\omega_3)(-U-i\,\omega_3)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{7\,i\cosh^2\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2}{2\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{19\,i\cosh\left(\frac{U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,i\cosh\left(\frac{U\,\beta}{2}\right)\cosh\left(\frac{3\,U\,\beta}{2}\right)\text{sech}^2\left(\frac{U\,\beta}{4}\right)\omega_2}{6\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{4\,i\cosh\left(\frac{3U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{8\,i\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{21\,i\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3}{2\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{19\,i\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,i\cosh\left(\frac{U\beta}{2}\right)\cosh\left(\frac{3U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3}{2\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{4\,i\cosh\left(\frac{3U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{8\,i\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,i\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)}{\omega_1\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{15\,i\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)}{\omega_1\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{8\,i\operatorname{sech}^2\left(\frac{U\beta}{4}\right)}{\omega_1\left(\frac{U^2}{4}+\omega_3^2\right)}+$$

$$\frac{8\,i\,e^{-i\beta\omega_3}\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2}{\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\,i\,e^{-i\beta\omega_3}\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2}{\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}+\frac{7\,i\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2}{\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-$$

$$\frac{8\,i\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2}{\left(\frac{U^2}{4}+\omega_2^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)}-\frac{7\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3^2\tanh\left(\frac{U\beta}{4}\right)}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}+\frac{38\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3^2\tanh\left(\frac{U\beta}{4}\right)}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}+$$

$$\frac{7\cosh\left(\frac{U\beta}{2}\right)\cosh\left(\frac{3U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3^2\tanh\left(\frac{U\beta}{4}\right)}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}-\frac{8\cosh\left(\frac{3U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3^2\tanh\left(\frac{U\beta}{4}\right)}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}-$$

$$\frac{16\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3^2\tanh\left(\frac{U\beta}{4}\right)}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}-\frac{7\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\beta}{4}\right)}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}+\frac{38\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\beta}{4}\right)}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}+$$

$$\frac{7\cosh\left(\frac{U\beta}{2}\right)\cosh\left(\frac{3U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\beta}{4}\right)}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}-\frac{8\cosh\left(\frac{3U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\beta}{4}\right)}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}-$$

$$\frac{16\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_2\,\omega_3\tanh\left(\frac{U\beta}{4}\right)}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}+\frac{14\cosh^2\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\tanh\left(\frac{U\beta}{4}\right)}{\omega_1\left(\frac{U^2}{4}+\omega_3^2\right)U}-\frac{30\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\tanh\left(\frac{U\beta}{4}\right)}{\omega_1\left(\frac{U^2}{4}+\omega_3^2\right)U}+$$

$$\frac{16\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\omega_3\tanh\left(\frac{U\beta}{4}\right)}{\omega_1\left(\frac{U^2}{4}+\omega_3^2\right)U}+\frac{7\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{U\beta}{2}\right)\omega_3^2}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}-\frac{8\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{U\beta}{2}\right)\omega_3^2}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}-$$

$$\frac{7\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{3U\beta}{2}\right)\omega_3^2}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}+\frac{8\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{3U\beta}{2}\right)\omega_3^2}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}+\frac{7\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{U\beta}{2}\right)\omega_2\,\omega_3}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}-$$

$$\frac{8\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{U\beta}{2}\right)\omega_2\,\omega_3}{\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}-\frac{7\cosh\left(\frac{U\beta}{2}\right)\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{3U\beta}{2}\right)\omega_2\,\omega_3}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}+\frac{8\operatorname{sech}^2\left(\frac{U\beta}{4}\right)\sinh\left(\frac{3U\beta}{2}\right)\omega_2\,\omega_3}{3\left(U^2+\omega_1^2\right)\left(\frac{U^2}{4}+\omega_3^2\right)U}$$