First Order Conditions Approach with Entropic Latent Variable Integration (ELVIS)

The Data Generating Process

- We have two goods and two time periods, ckt for t=1,2 (time), and k=a,b (goods). We consider a case of a Cobb-Douglas Utility function with income w=1 almost surely.

In[64]:=
```
ca1true = α / pa1
```
Out[64]=
$$\frac{\alpha}{\text{pa1}}$$

In[65]:=
```
cb1true = (1 - α) / pb1
```
Out[65]=
$$\frac{1-\alpha}{\text{pb1}}$$

In[66]:=
```
ca2true = α / pa2
```
Out[66]=
$$\frac{\alpha}{\text{pa2}}$$

In[67]:=
```
cb2true = (1 - α) / pb2
```
Out[67]=
$$\frac{1-\alpha}{\text{pb2}}$$

- This is measurement error in consumption.

In[68]:=
```
wa1 = ca1true - ca1
```
Out[68]=
$$-\text{ca1}+\frac{\alpha}{\text{pa1}}$$

In[69]:=
```
wa2 = ca2true - ca2
```
Out[69]=
$$-\text{ca2}+\frac{\alpha}{\text{pa2}}$$

In[70]:=
```
wb1 = cb1true - cb1
```
Out[70]=
$$-\text{cb1}+\frac{1-\alpha}{\text{pb1}}$$

In[71]:=
```
wb2 = cb2true - cb2
```
Out[71]=
$$-\text{cb2}+\frac{1-\alpha}{\text{pb2}}$$

Construction of the Maximum Entropy Distribution conditional on Moments according to ELVIS

- We first create the numerator of the user-provided prior over the problem, this is the etanumerator. The first step is to compute the Euclidean norm of the set of moments.

In[72]:=
```
normmomentssquared = (wa1)^2 + (wa2)^2 + (wb1)^2 + (wb2)^2
```
Out[72]=
$$\left(-\text{cb1}+\frac{1-\alpha}{\text{pb1}}\right)^2+\left(-\text{cb2}+\frac{1-\alpha}{\text{pb2}}\right)^2+\left(-\text{ca1}+\frac{\alpha}{\text{pa1}}\right)^2+\left(-\text{ca2}+\frac{\alpha}{\text{pa2}}\right)^2$$

- The etanumerator is the product of Exp[-||g||^2]*pdf of α, since pdf of α is a uniform we leave it implicit here as 1 and we will impose the domain constraints later on.

In[77]:=
```
etanumerator = Exp[-normmomentssquared]
```
Out[77]=
$$e^{-\left(-\text{cb1}+\frac{1-\alpha}{\text{pb1}}\right)^2-\left(-\text{cb2}+\frac{1-\alpha}{\text{pb2}}\right)^2-\left(-\text{ca1}+\frac{\alpha}{\text{pa1}}\right)^2-\left(-\text{ca2}+\frac{\alpha}{\text{pa2}}\right)^2}$$

- This is the vector of moments g

In[78]:=
```
g = {wa1, wa2, wb1, wb2}
```
Out[78]=
$$\left\{-\text{ca1}+\frac{\alpha}{\text{pa1}},\ -\text{ca2}+\frac{\alpha}{\text{pa2}},\ -\text{cb1}+\frac{1-\alpha}{\text{pb1}},\ -\text{cb2}+\frac{1-\alpha}{\text{pb2}}\right\}$$

- This is the vector of γ the parameter of the ELVIS distribution

In[79]:=
```
gamma = {γ1, γ2, γ3, γ4}
```
Out[79]=
$$\{\gamma 1,\ \gamma 2,\ \gamma 3,\ \gamma 4\}$$

- This is the Maximum Entropy Distribution According to ELVIS numerator, the product of EXP[γ'g]etanumerator

In[80]:=
```
etastarnumerator = FullSimplify[Exp[gamma.g] * etanumerator]
```
Out[80]=
$$e^{-\frac{(-1+\text{cb1}\,\text{pb1}+\alpha)^2}{\text{pb1}^2}-\frac{(-1+\text{cb2}\,\text{pb2}+\alpha)^2}{\text{pb2}^2}-\left(\text{ca1}-\frac{\alpha}{\text{pa1}}\right)^2-\left(\text{ca2}-\frac{\alpha}{\text{pa2}}\right)^2+\left(-\text{ca1}+\frac{\alpha}{\text{pa1}}\right)\gamma 1+\left(-\text{ca2}+\frac{\alpha}{\text{pa2}}\right)\gamma 2-\text{cb1}\,\gamma 3+\frac{\gamma 3-\alpha\,\gamma 3}{\text{pb1}}-\text{cb2}\,\gamma 4+\frac{\gamma 4-\alpha\,\gamma 4}{\text{pb2}}}$$

- In order to obtain a pdf of the Maximum Entropy Distribution According to ELVIS, we need to integrate etastarnumerator in the domain of α with respect to the uniform distribution. This is the partition function. Typically this cannot be obtained closed form, this is an exception rather than the rule.

In[81]:=
```
partitioneta = FullSimplify[Integrate[etastarnumerator, {α, 0, 1}]]
```

Out[81]=

$$\left(e^{-\frac{1}{4\,pa2^2\,pb1^2\,pb2^2+4\,pa1^2\,\left(pb1^2\,pb2^2+pa2^2\,\left(pb1^2+pb2^2\right)\right)}\left(2\,pa1\,pa2\,(2\,ca1+\gamma1)\,\left(-pb1^2\,pb2^2\,(2\,ca2+\gamma2)+pa2\,\left(-2\,pb2^2+pb1\,pb2^2\,(2\,cb1+\gamma3)+pb1^2\,(-2+\right.\right.\right.\right.$$

$$pa1\,pa2\,pb1\,pb2\,\sqrt{\pi}$$
$$\left(-\text{Erf}\left[\left(-2\,pa2^2\,pb1\,pb2+pa1\,pa2^2\,pb1\,pb2\,(2\,ca1+\gamma1)-pa1^2\,\left(2\,pb1\,pb2-\right.\right.\right.\right.$$
$$\left.\left.\left.\left.pa2\,pb1\,pb2\,(2\,ca2+\gamma2)+pa2^2\,(2\,cb2\,pb1+2\,cb1\,pb2+pb2\,\gamma3+pb1\,\gamma4)\right)\right)\Big/\right.$$
$$\left.\left(2\,pa1\,pa2\,\sqrt{pa2^2\,pb1^2\,pb2^2+pa1^2\,\left(pa2^2\,pb1^2+\left(pa2^2+pb1^2\right)\,pb2^2\right)}\right)\right]+$$
$$\text{Erf}\left[\left(pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma1)+pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma2)-\right.\right.$$
$$\left.\left.pa1\,pa2\,\left(-2\,pb2^2+pb1\,pb2^2\,(2\,cb1+\gamma3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma4)\right)\right)\Big/\right.$$
$$\left.\left.\left(2\,pb1\,pb2\,\sqrt{pa2^2\,pb1^2\,pb2^2+pa1^2\,\left(pa2^2\,pb1^2+\left(pa2^2+pb1^2\right)\,pb2^2\right)}\right)\right]\right)\Big/$$
$$\left(2\,\sqrt{pa2^2\,pb1^2\,pb2^2+pa1^2\,\left(pb1^2\,pb2^2+pa2^2\,\left(pb1^2+pb2^2\right)\right)}\right)$$

- We capture our knowledge about the domain of symbolic variables in Assumptionselvis.

In[82]:=
```
Assumptionselvis =
 ca1 ≥ 0 && ca2 ≥ 0 && cb1 ≥ 0 && cb2 ≥ 0 && pa1 > 0 && pa2 > 0 && pb1 > 0 && pb2 > 0
```

Out[82]=

$$ca1 \geq 0 \;\&\&\; ca2 \geq 0 \;\&\&\; cb1 \geq 0 \;\&\&\; cb2 \geq 0 \;\&\&\; pa1 > 0 \;\&\&\; pa2 > 0 \;\&\&\; pb1 > 0 \;\&\&\; pb2 > 0$$

- We write down the pdf.

In[83]:=
```
etadistribution = FullSimplify[etastarnumerator / partitioneta, Assumptionselvis]
```

Out[83]=

$$-\left(\left(2\, e^{-\frac{\left(2\,pa2^2\,pb1^2\,pb2^2\,\alpha - pa1\,pa2^2\,pb1^2\,pb2^2\,(2\,ca1+\gamma1) + pa1^2\left(2\,pb1^2\,pb2^2\,\alpha - pa2\,pb1^2\,pb2^2\,(2\,ca2+\gamma2) + pa2^2\left(2\,pb2^2\,(-1+\alpha) + pb1\,pb2^2\,(2\,cb1+\gamma3) + pb1^2\,(-2+2\,cb2\,pb2+2\,\alpha+pb2\,\gamma4)\right)\right)\right)}{4\,pa1^2\,pa2^4\,pb1^4\,pb2^4 + 4\,pa1^4\left(pa2^2\,pb1^4\,pb2^4 + pa2^4\,pb1^2\,pb2^2\left(pb1^2+pb2^2\right)\right)}}\right.\right.$$
$$\left.\sqrt{pa2^2\,pb1^2\,pb2^2 + pa1^2\left(pb1^2\,pb2^2 + pa2^2\left(pb1^2+pb2^2\right)\right)}\right) \Big/ \left(pa1\,pa2\,pb1\right.$$
$$pb2\,\sqrt{\pi}\,\left(\text{Erf}\left[\left(-2\,pa2^2\,pb1\,pb2 + pa1\,pa2^2\,pb1\,pb2\,(2\,ca1+\gamma1) - pa1^2\left(2\,pb1\,pb2 - \right.\right.\right.\right.$$
$$\left.\left.\left.\left.pa2\,pb1\,pb2\,(2\,ca2+\gamma2) + pa2^2\,(2\,cb2\,pb1 + 2\,cb1\,pb2 + pb2\,\gamma3 + pb1\,\gamma4)\right)\right) \Big/ \right.$$
$$\left.\left(2\,pa1\,pa2\,\sqrt{pa2^2\,pb1^2\,pb2^2 + pa1^2\left(pa2^2\,pb1^2 + \left(pa2^2+pb1^2\right)pb2^2\right)}\right)\right] -$$
$$\text{Erf}\left[\left(pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma1) + pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma2) - \right.\right.$$
$$\left.\left.pa1\,pa2\left(-2\,pb2^2 + pb1\,pb2^2\,(2\,cb1+\gamma3) + pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma4)\right)\right) \Big/ \right.$$
$$\left.\left.\left.\left(2\,pb1\,pb2\,\sqrt{pa2^2\,pb1^2\,pb2^2 + pa1^2\left(pa2^2\,pb1^2 + \left(pa2^2+pb1^2\right)pb2^2\right)}\right)\right]\right)\right)\Bigg)$$

- The new pdf has to integrate up to 1 in the domain of the latent variable, α. This is because the partition function was used to normalize the numerator.

In[85]:=
```
Integrate[etadistribution, {α, 0, 1}]
```

Out[85]=

1

Computation of the Maximum Entropy Moments h:

- We write down the integrand or the argument of the expectation that we will use to obtain h, this is the first entry of the vector h with respect to good a and time 1.

In[86]:=
```
Integrandha1 = FullSimplify[wa1 * etadistribution, Assumptionselvis]
```

Out[86]=

$$\left(2\, e^{-\frac{\left(2\, pa2^2\, pb1^2\, pb2^2\, \alpha - pa1\, pa2^2\, pb1^2\, pb2^2\, (2\, ca1+\gamma 1) + pa1^2\, \left(2\, pb1^2\, pb2^2\, \alpha - pa2\, pb1^2\, pb2^2\, (2\, ca2+\gamma 2) + pa2^2\, \left(2\, pb2^2\, (-1+\alpha) + pb1\, pb2^2\, (2\, cb1+\gamma 3) + pb1^2\, (-2+2\, cb2\, pb2+2\, \alpha + pb2\, \gamma 4)\right)\right)\right)^2}{4\, pa1^2\, pa2^4\, pb1^4\, pb2^4 + 4\, pa1^4\, \left(pa2^2\, pb1^4\, pb2^4 + pa2^4\, pb1^2\, pb2^2\, \left(pb1^2+pb2^2\right)\right)}} \sqrt{pa2^2\, pb1^2\, pb2^2 + pa1^2\, \left(pb1^2\, pb2^2 + pa2^2\, \left(pb1^2+pb2^2\right)\right)}\; (ca1\, pa1 - \alpha)\right) \Big/$$

$$\left(pa1^2\, pa2\, pb1\, pb2\, \sqrt{\pi}\, \left(\mathrm{Erf}\left[\left(-2\, pa2^2\, pb1\, pb2 + pa1\, pa2^2\, pb1\, pb2\, (2\, ca1+\gamma 1) - pa1^2\, \left(2\, pb1\, pb2 - pa2\, pb1\, pb2\, (2\, ca2+\gamma 2) + pa2^2\, (2\, cb2\, pb1 + 2\, cb1\, pb2 + pb2\, \gamma 3 + pb1\, \gamma 4)\right)\right) \Big/ \left(2\, pa1\, pa2\, \sqrt{pa2^2\, pb1^2\, pb2^2 + pa1^2\, \left(pa2^2\, pb1^2 + \left(pa2^2+pb1^2\right) pb2^2\right)}\right)\right] - \mathrm{Erf}\left[\left(pa2\, pb1^2\, pb2^2\, (2\, ca1+\gamma 1) + pa1\, pb1^2\, pb2^2\, (2\, ca2+\gamma 2) - pa1\, pa2\, \left(-2\, pb2^2 + pb1\, pb2^2\, (2\, cb1+\gamma 3) + pb1^2\, (-2+2\, cb2\, pb2+pb2\, \gamma 4)\right)\right) \Big/ \left(2\, pb1\, pb2\, \sqrt{pa2^2\, pb1^2\, pb2^2 + pa1^2\, \left(pa2^2\, pb1^2 + \left(pa2^2+pb1^2\right) pb2^2\right)}\right)\right]\right)\right)$$

In[87]:=
```
ha1 = Integrate[Integrandha1, {α, 0, 1}, Assumptions → Assumptionselvis]
```

Out[87]=

$$\Bigg(2\, e^{-\left(\left(-2\, pa1\, pa2\, pb1^2 + 2\, cb2\, pa1\, pa2\, pb1^2\, pb2 - 2\, pa1\, pa2\, pb2^2 + 2\, cb1\, pa1\, pa2\, pb1\, pb2^2 - 2\, ca2\, pa1\, pb1^2\, pb2^2 - 2\, ca1\, pa2\, pb1^2\, pb2^2 - pa2\, pb}\right.\right.}$$

$$\sqrt{pa2^2\, pb1^2\, pb2^2 + pa1^2\, \left(pb1^2\, pb2^2 + pa2^2\, \left(pb1^2+pb2^2\right)\right)}$$

$$\left(-\frac{1}{\sqrt{\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}}}\, e^{-\frac{\left(\frac{2\, ca1}{pa1}+\frac{2\, ca2}{pa2}+\frac{2}{pb1^2}-\frac{2\, cb1}{pb1}+\frac{2}{pb2^2}-\frac{2\, cb2}{pb2}+\frac{\gamma 1}{pa1}+\frac{\gamma 2}{pa2}-\frac{\gamma 3}{pb1}-\frac{\gamma 4}{pb2}\right)^2}{4\left(-\frac{1}{pa1^2}-\frac{1}{pa2^2}-\frac{1}{pb1^2}-\frac{1}{pb2^2}\right)}} \left(-\left(\left(-1 + \right.\right.\right.\right.$$

$$e^{-\left(\left(2\, cb2\, pa1^2\, pa2^2\, pb1 + 2\, cb1\, pa1^2\, pa2^2\, pb2 + 2\, pa1^2\, pb1\, pb2 - 2\, ca2\, pa1^2\, pa2\, pb1\, pb2 + 2\, pa2^2\, pb1\, pb2 - 2\, ca1\, pa1\, p\right.\right.}$$

$$\left.\left.\right) \Big/ \left(2\, \sqrt{\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}}\right)\right) -$$

$$\frac{1}{2\, \sqrt{\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}}}\, e^{-\frac{\left(pa2\, pb1^2\, pb2^2\, (2\, ca1+\gamma 1) + pa1\, pb1^2\, pb2^2\, (2\, ca2+\gamma 2) - pa1\, pa2\, \left(-2\, pb2^2 + pb1\, pb2^2\, (2\, cb1+\gamma 3) + pb1^2\, (-2+2\, cb2\, pb2+pb2\, \gamma 4)\right)\right)^2}{4\, pb1^2\, pb2^2\, \left(pa2^2\, pb1^2\, pb2^2 + pa1^2\, \left(pb1^2\, pb2^2 + pa2^2\, \left(pb1^2+pb2^2\right)\right)\right)}}$$

$$\left(-1 + e^{\frac{\left(pa2\, pb1^2\, pb2^2\, (2\, ca1+\gamma 1) + pa1\, pb1^2\, pb2^2\, (2\, ca2+\gamma 2) - pa1\, pa2\, \left(-2\, pb2^2 + pb1\, pb2^2\, (2\, cb1+\gamma 3) + pb1^2\, (-2+2\, cb2\, pb2+pb2\, \gamma 4)\right)\right)^2}{4\, pb1^2\, pb2^2\, \left(pa2^2\, pb1^2\, pb2^2 + pa1^2\, \left(pb1^2\, pb2^2 + pa2^2\, \left(pb1^2+pb2^2\right)\right)\right)}}\right) +$$

$$\left(ca1\, \sqrt{\pi}\, \left(2\, cb2\, pa1^2\, pa2^2\, pb1 + 2\, cb1\, pa1^2\, pa2^2\, pb2 + 2\, pa1^2\, pb1\, pb2 - 2\, ca2\, pa1^2\, pa2\, pb1\, pb2 + 2\, pa2^2\, pb1\, pb2 - 2\, ca1\, pa1\, pa2^2\, pb1\, pb2 - pa1\, pa2^2\right.\right.$$

$$
\begin{aligned}
&\text{pb1 pb2 } \gamma 1 - \text{pa1}^2 \text{ pa2 pb1 pb2 } \gamma 2 + \text{pa1}^2 \text{ pa2}^2 \text{ pb2 } \gamma 3 + \text{pa1}^2 \text{ pa2}^2 \text{ pb1 } \gamma 4\Big) \text{ Erf}\Big[\\
&\left(\sqrt{\left(2 \text{ cb2 pa1}^2 \text{ pa2}^2 \text{ pb1} + 2 \text{ cb1 pa1}^2 \text{ pa2}^2 \text{ pb2} + 2 \text{ pa1}^2 \text{ pb1 pb2} - 2 \text{ ca2 pa1}^2 \text{ pa2}\right.\right. \\
&\qquad \text{pb1 pb2} + 2 \text{ pa2}^2 \text{ pb1 pb2} - 2 \text{ ca1 pa1 pa2}^2 \text{ pb1 pb2} - \text{pa1 pa2}^2 \text{ pb1 pb2} \\
&\qquad \left.\left. \gamma 1 - \text{pa1}^2 \text{ pa2 pb1 pb2 } \gamma 2 + \text{pa1}^2 \text{ pa2}^2 \text{ pb2 } \gamma 3 + \text{pa1}^2 \text{ pa2}^2 \text{ pb1 } \gamma 4\right)^2\right) \Big/ \\
&\left(2 \sqrt{\text{pa1}^2 \text{ pa2}^4 \text{ pb1}^2 \text{ pb2}^2 + \text{pa1}^4 \left(\text{pa2}^2 \text{ pb1}^2 \text{ pb2}^2 + \text{pa2}^4 \left(\text{pb1}^2 + \text{pb2}^2\right)\right)}\right)\Big]\Big) \Big/ \\
&\left(2 \text{ pa1} \left(\frac{1}{\text{pa1}^2} + \frac{1}{\text{pa2}^2} + \frac{1}{\text{pb1}^2} + \frac{1}{\text{pb2}^2}\right) \sqrt{\left(2 \text{ cb2 pa1}^2 \text{ pa2}^2 \text{ pb1} + \right.}\right. \\
&\qquad 2 \text{ cb1 pa1}^2 \text{ pa2}^2 \text{ pb2} + 2 \text{ pa1}^2 \text{ pb1 pb2} - 2 \text{ ca2 pa1}^2 \text{ pa2 pb1 pb2} + \\
&\qquad 2 \text{ pa2}^2 \text{ pb1 pb2} - 2 \text{ ca1 pa1 pa2}^2 \text{ pb1 pb2} - \text{pa1 pa2}^2 \text{ pb1 pb2 } \gamma 1 - \\
&\qquad \left.\left. \text{pa1}^2 \text{ pa2 pb1 pb2 } \gamma 2 + \text{pa1}^2 \text{ pa2}^2 \text{ pb2 } \gamma 3 + \text{pa1}^2 \text{ pa2}^2 \text{ pb1 } \gamma 4\right)^2\right) + \\
&\left(\text{ca2} \sqrt{\pi} \left(2 \text{ cb2 pa1}^2 \text{ pa2}^2 \text{ pb1} + 2 \text{ cb1 pa1}^2 \text{ pa2}^2 \text{ pb2} + 2 \text{ pa1}^2 \text{ pb1 pb2} - \right.\right. \\
&\qquad 2 \text{ ca2 pa1}^2 \text{ pa2 pb1 pb2} + 2 \text{ pa2}^2 \text{ pb1 pb2} - 2 \text{ ca1 pa1 pa2}^2 \text{ pb1 pb2} - \text{pa1 pa2}^2 \\
&\qquad \text{pb1 pb2 } \gamma 1 - \text{pa1}^2 \text{ pa2 pb1 pb2 } \gamma 2 + \text{pa1}^2 \text{ pa2}^2 \text{ pb2 } \gamma 3 + \text{pa1}^2 \text{ pa2}^2 \text{ pb1 } \gamma 4\Big) \text{ Erf}\Big[\\
&\left(\sqrt{\left(2 \text{ cb2 pa1}^2 \text{ pa2}^2 \text{ pb1} + 2 \text{ cb1 pa1}^2 \text{ pa2}^2 \text{ pb2} + 2 \text{ pa1}^2 \text{ pb1 pb2} - 2 \text{ ca2 pa1}^2 \text{ pa2}\right.\right. \\
&\qquad \text{pb1 pb2} + 2 \text{ pa2}^2 \text{ pb1 pb2} - 2 \text{ ca1 pa1 pa2}^2 \text{ pb1 pb2} - \text{pa1 pa2}^2 \text{ pb1 pb2} \\
&\qquad \left.\left. \gamma 1 - \text{pa1}^2 \text{ pa2 pb1 pb2 } \gamma 2 + \text{pa1}^2 \text{ pa2}^2 \text{ pb2 } \gamma 3 + \text{pa1}^2 \text{ pa2}^2 \text{ pb1 } \gamma 4\right)^2\right) \Big/ \\
&\left(2 \sqrt{\text{pa1}^2 \text{ pa2}^4 \text{ pb1}^2 \text{ pb2}^2 + \text{pa1}^4 \left(\text{pa2}^2 \text{ pb1}^2 \text{ pb2}^2 + \text{pa2}^4 \left(\text{pb1}^2 + \text{pb2}^2\right)\right)}\right)\Big]\Big) \Big/ \\
&\left(2 \text{ pa2} \left(\frac{1}{\text{pa1}^2} + \frac{1}{\text{pa2}^2} + \frac{1}{\text{pb1}^2} + \frac{1}{\text{pb2}^2}\right) \sqrt{\left(2 \text{ cb2 pa1}^2 \text{ pa2}^2 \text{ pb1} + \right.}\right. \\
&\qquad 2 \text{ cb1 pa1}^2 \text{ pa2}^2 \text{ pb2} + 2 \text{ pa1}^2 \text{ pb1 pb2} - 2 \text{ ca2 pa1}^2 \text{ pa2 pb1 pb2} + \\
&\qquad 2 \text{ pa2}^2 \text{ pb1 pb2} - 2 \text{ ca1 pa1 pa2}^2 \text{ pb1 pb2} - \text{pa1 pa2}^2 \text{ pb1 pb2 } \gamma 1 - \\
&\qquad \left.\left. \text{pa1}^2 \text{ pa2 pb1 pb2 } \gamma 2 + \text{pa1}^2 \text{ pa2}^2 \text{ pb2 } \gamma 3 + \text{pa1}^2 \text{ pa2}^2 \text{ pb1 } \gamma 4\right)^2\right) + \\
&\left(\sqrt{\pi} \left(2 \text{ cb2 pa1}^2 \text{ pa2}^2 \text{ pb1} + 2 \text{ cb1 pa1}^2 \text{ pa2}^2 \text{ pb2} + 2 \text{ pa1}^2 \text{ pb1 pb2} - 2 \text{ ca2 pa1}^2 \right.\right. \\
&\qquad \text{pa2 pb1 pb2} + 2 \text{ pa2}^2 \text{ pb1 pb2} - 2 \text{ ca1 pa1 pa2}^2 \text{ pb1 pb2} - \text{pa1 pa2}^2 \text{ pb1 pb2 } \gamma 1 - \\
&\qquad \left.\text{pa1}^2 \text{ pa2 pb1 pb2 } \gamma 2 + \text{pa1}^2 \text{ pa2}^2 \text{ pb2 } \gamma 3 + \text{pa1}^2 \text{ pa2}^2 \text{ pb1 } \gamma 4\right) \text{ Erf}\Big[\\
&\left(\sqrt{\left(2 \text{ cb2 pa1}^2 \text{ pa2}^2 \text{ pb1} + 2 \text{ cb1 pa1}^2 \text{ pa2}^2 \text{ pb2} + 2 \text{ pa1}^2 \text{ pb1 pb2} - 2 \text{ ca2 pa1}^2 \text{ pa2}\right.\right. \\
&\qquad \text{pb1 pb2} + 2 \text{ pa2}^2 \text{ pb1 pb2} - 2 \text{ ca1 pa1 pa2}^2 \text{ pb1 pb2} - \text{pa1 pa2}^2 \text{ pb1 pb2} \\
&\qquad \left.\left. \gamma 1 - \text{pa1}^2 \text{ pa2 pb1 pb2 } \gamma 2 + \text{pa1}^2 \text{ pa2}^2 \text{ pb2 } \gamma 3 + \text{pa1}^2 \text{ pa2}^2 \text{ pb1 } \gamma 4\right)^2\right) \Big/ \\
&\left(2 \sqrt{\text{pa1}^2 \text{ pa2}^4 \text{ pb1}^2 \text{ pb2}^2 + \text{pa1}^4 \left(\text{pa2}^2 \text{ pb1}^2 \text{ pb2}^2 + \text{pa2}^4 \left(\text{pb1}^2 + \text{pb2}^2\right)\right)}\right)\Big]\Big) \Big/ \\
&\left(2 \text{ pb1}^2 \left(\frac{1}{\text{pa1}^2} + \frac{1}{\text{pa2}^2} + \frac{1}{\text{pb1}^2} + \frac{1}{\text{pb2}^2}\right) \sqrt{\left(2 \text{ cb2 pa1}^2 \text{ pa2}^2 \text{ pb1} + \right.}\right. \\
&\qquad 2 \text{ cb1 pa1}^2 \text{ pa2}^2 \text{ pb2} + 2 \text{ pa1}^2 \text{ pb1 pb2} - 2 \text{ ca2 pa1}^2 \text{ pa2 pb1 pb2} + \\
&\qquad 2 \text{ pa2}^2 \text{ pb1 pb2} - 2 \text{ ca1 pa1 pa2}^2 \text{ pb1 pb2} - \text{pa1 pa2}^2 \text{ pb1 pb2 } \gamma 1 - \\
&\qquad \left.\left. \text{pa1}^2 \text{ pa2 pb1 pb2 } \gamma 2 + \text{pa1}^2 \text{ pa2}^2 \text{ pb2 } \gamma 3 + \text{pa1}^2 \text{ pa2}^2 \text{ pb1 } \gamma 4\right)^2\right) -
\end{aligned}
$$

$$\Big(\mathrm{cb1}\ \sqrt{\pi}\ \big(2\,\mathrm{cb2}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}+2\,\mathrm{cb1}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}+2\,\mathrm{pa1}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca2}\,\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}+2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca1}\,\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma1-\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma2+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma3+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\gamma4\big)\ \mathrm{Erf}\Big[\Big(\sqrt{\big(2\,\mathrm{cb2}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}+2\,\mathrm{cb1}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}+2\,\mathrm{pa1}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca2}\,\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}+2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca1}\,\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma1-\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma2+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma3+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\gamma4\big)^2\Big)\Big/\Big(2\,\sqrt{\mathrm{pa1}^2\,\mathrm{pa2}^4\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^4\,\big(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^4\,\big(\mathrm{pb1}^2+\mathrm{pb2}^2\big)\big)}\Big)\Big]\big)\Big/\Big(2\,\mathrm{pb1}\,\Big(\frac{1}{\mathrm{pa1}^2}+\frac{1}{\mathrm{pa2}^2}+\frac{1}{\mathrm{pb1}^2}+\frac{1}{\mathrm{pb2}^2}\Big)\sqrt{\big(2\,\mathrm{cb2}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}+2\,\mathrm{cb1}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}+2\,\mathrm{pa1}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca2}\,\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}+2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca1}\,\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma1-\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma2+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma3+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\gamma4\big)^2}\Big)+\Big(\sqrt{\pi}\ \big(2\,\mathrm{cb2}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}+2\,\mathrm{cb1}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}+2\,\mathrm{pa1}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca2}\,\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}+2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca1}\,\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma1-\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma2+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma3+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\gamma4\big)\ \mathrm{Erf}\Big[\Big(\sqrt{\big(2\,\mathrm{cb2}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}+2\,\mathrm{cb1}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}+2\,\mathrm{pa1}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca2}\,\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}+2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca1}\,\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma1-\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma2+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma3+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\gamma4\big)^2\Big)\Big/\Big(2\,\sqrt{\mathrm{pa1}^2\,\mathrm{pa2}^4\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^4\,\big(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^4\,\big(\mathrm{pb1}^2+\mathrm{pb2}^2\big)\big)}\Big)\Big]\big)\Big/\Big(2\,\Big(\frac{1}{\mathrm{pa1}^2}+\frac{1}{\mathrm{pa2}^2}+\frac{1}{\mathrm{pb1}^2}+\frac{1}{\mathrm{pb2}^2}\Big)\,\mathrm{pb2}^2\sqrt{\big(2\,\mathrm{cb2}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}+2\,\mathrm{cb1}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}+2\,\mathrm{pa1}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca2}\,\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}+2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca1}\,\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma1-\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma2+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma3+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\gamma4\big)^2}\Big)-\Big(\mathrm{cb2}\ \sqrt{\pi}\ \big(2\,\mathrm{cb2}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}+2\,\mathrm{cb1}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}+2\,\mathrm{pa1}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca2}\,\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}+2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca1}\,\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma1-\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma2+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma3+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\gamma4\big)\ \mathrm{Erf}\Big[\Big(\sqrt{\big(2\,\mathrm{cb2}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}+2\,\mathrm{cb1}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}+2\,\mathrm{pa1}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca2}\,\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}+2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca1}\,\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}-\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma1-\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}\,\gamma2+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma3+\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\gamma4\big)^2\Big)\Big/\Big(2\,\sqrt{\mathrm{pa1}^2\,\mathrm{pa2}^4\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^4\,\big(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^4\,\big(\mathrm{pb1}^2+\mathrm{pb2}^2\big)\big)}\Big)\Big]\big)\Big/\Big(2\,\Big(\frac{1}{\mathrm{pa1}^2}+\frac{1}{\mathrm{pa2}^2}+\frac{1}{\mathrm{pb1}^2}+\frac{1}{\mathrm{pb2}^2}\Big)\,\mathrm{pb2}\sqrt{\big(2\,\mathrm{cb2}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}+2\,\mathrm{cb1}\,\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb2}+2\,\mathrm{pa1}^2\,\mathrm{pb1}\,\mathrm{pb2}-2\,\mathrm{ca2}\,\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}\,\mathrm{pb2}+$$

$$
\begin{aligned}
&2\,pa2^2\,pb1\,pb2 - 2\,ca1\,pa1\,pa2^2\,pb1\,pb2 - pa1\,pa2^2\,pb1\,pb2\,\gamma1 - \\
&pa1^2\,pa2\,pb1\,pb2\,\gamma2 + pa1^2\,pa2^2\,pb2\,\gamma3 + pa1^2\,pa2^2\,pb1\,\gamma4\Big)^2\Big) + \\
&\Big(\sqrt{\pi}\,\gamma1\,\big(2\,cb2\,pa1^2\,pa2^2\,pb1 + 2\,cb1\,pa1^2\,pa2^2\,pb2 + 2\,pa1^2\,pb1\,pb2 - \\
&2\,ca2\,pa1^2\,pa2\,pb1\,pb2 + 2\,pa2^2\,pb1\,pb2 - 2\,ca1\,pa1\,pa2^2\,pb1\,pb2 - pa1\,pa2^2\,pb1\,pb2\,\gamma1 - pa1^2\,pa2\,pb1\,pb2\,\gamma2 + pa1^2\,pa2^2\,pb2\,\gamma3 + pa1^2\,pa2^2\,pb1\,\gamma4\big)\,\mathrm{Erf}\Big[\Big(\sqrt{\big(2\,cb2\,pa1^2\,pa2^2\,pb1 + 2\,cb1\,pa1^2\,pa2^2\,pb2 + 2\,pa1^2\,pb1\,pb2 - 2\,ca2\,pa1^2\,pa2\,pb1\,pb2 + 2\,pa2^2\,pb1\,pb2 - 2\,ca1\,pa1\,pa2^2\,pb1\,pb2 - pa1\,pa2^2\,pb1\,pb2\,\gamma1 - pa1^2\,pa2\,pb1\,pb2\,\gamma2 + pa1^2\,pa2^2\,pb2\,\gamma3 + pa1^2\,pa2^2\,pb1\,\gamma4\big)^2}\Big)\Big/\Big(2\,\sqrt{pa1^2\,pa2^4\,pb1^2\,pb2^2 + pa1^4\,\big(pa2^2\,pb1^2\,pb2^2 + pa2^4\,\big(pb1^2 + pb2^2\big)\big)}\Big)\Big]\Big)\Big/ \\
&\Big(4\,pa1\,\Big(\frac{1}{pa1^2} + \frac{1}{pa2^2} + \frac{1}{pb1^2} + \frac{1}{pb2^2}\Big)\sqrt{\big(2\,cb2\,pa1^2\,pa2^2\,pb1 + \\
&2\,cb1\,pa1^2\,pa2^2\,pb2 + 2\,pa1^2\,pb1\,pb2 - 2\,ca2\,pa1^2\,pa2\,pb1\,pb2 + \\
&2\,pa2^2\,pb1\,pb2 - 2\,ca1\,pa1\,pa2^2\,pb1\,pb2 - pa1\,pa2^2\,pb1\,pb2\,\gamma1 - \\
&pa1^2\,pa2\,pb1\,pb2\,\gamma2 + pa1^2\,pa2^2\,pb2\,\gamma3 + pa1^2\,pa2^2\,pb1\,\gamma4\big)^2}\Big) + \\
&\Big(\sqrt{\pi}\,\gamma2\,\big(2\,cb2\,pa1^2\,pa2^2\,pb1 + 2\,cb1\,pa1^2\,pa2^2\,pb2 + 2\,pa1^2\,pb1\,pb2 - \\
&2\,ca2\,pa1^2\,pa2\,pb1\,pb2 + 2\,pa2^2\,pb1\,pb2 - 2\,ca1\,pa1\,pa2^2\,pb1\,pb2 - pa1\,pa2^2\,pb1\,pb2\,\gamma1 - pa1^2\,pa2\,pb1\,pb2\,\gamma2 + pa1^2\,pa2^2\,pb2\,\gamma3 + pa1^2\,pa2^2\,pb1\,\gamma4\big)\,\mathrm{Erf}\Big[\Big(\sqrt{\big(2\,cb2\,pa1^2\,pa2^2\,pb1 + 2\,cb1\,pa1^2\,pa2^2\,pb2 + 2\,pa1^2\,pb1\,pb2 - 2\,ca2\,pa1^2\,pa2\,pb1\,pb2 + 2\,pa2^2\,pb1\,pb2 - 2\,ca1\,pa1\,pa2^2\,pb1\,pb2 - pa1\,pa2^2\,pb1\,pb2\,\gamma1 - pa1^2\,pa2\,pb1\,pb2\,\gamma2 + pa1^2\,pa2^2\,pb2\,\gamma3 + pa1^2\,pa2^2\,pb1\,\gamma4\big)^2}\Big)\Big/\Big(2\,\sqrt{pa1^2\,pa2^4\,pb1^2\,pb2^2 + pa1^4\,\big(pa2^2\,pb1^2\,pb2^2 + pa2^4\,\big(pb1^2 + pb2^2\big)\big)}\Big)\Big]\Big)\Big/ \\
&\Big(4\,pa2\,\Big(\frac{1}{pa1^2} + \frac{1}{pa2^2} + \frac{1}{pb1^2} + \frac{1}{pb2^2}\Big)\sqrt{\big(2\,cb2\,pa1^2\,pa2^2\,pb1 + \\
&2\,cb1\,pa1^2\,pa2^2\,pb2 + 2\,pa1^2\,pb1\,pb2 - 2\,ca2\,pa1^2\,pa2\,pb1\,pb2 + \\
&2\,pa2^2\,pb1\,pb2 - 2\,ca1\,pa1\,pa2^2\,pb1\,pb2 - pa1\,pa2^2\,pb1\,pb2\,\gamma1 - \\
&pa1^2\,pa2\,pb1\,pb2\,\gamma2 + pa1^2\,pa2^2\,pb2\,\gamma3 + pa1^2\,pa2^2\,pb1\,\gamma4\big)^2}\Big) - \\
&\Big(\sqrt{\pi}\,\gamma3\,\big(2\,cb2\,pa1^2\,pa2^2\,pb1 + 2\,cb1\,pa1^2\,pa2^2\,pb2 + 2\,pa1^2\,pb1\,pb2 - \\
&2\,ca2\,pa1^2\,pa2\,pb1\,pb2 + 2\,pa2^2\,pb1\,pb2 - 2\,ca1\,pa1\,pa2^2\,pb1\,pb2 - pa1\,pa2^2\,pb1\,pb2\,\gamma1 - pa1^2\,pa2\,pb1\,pb2\,\gamma2 + pa1^2\,pa2^2\,pb2\,\gamma3 + pa1^2\,pa2^2\,pb1\,\gamma4\big)\,\mathrm{Erf}\Big[\Big(\sqrt{\big(2\,cb2\,pa1^2\,pa2^2\,pb1 + 2\,cb1\,pa1^2\,pa2^2\,pb2 + 2\,pa1^2\,pb1\,pb2 - 2\,ca2\,pa1^2\,pa2\,pb1\,pb2 + 2\,pa2^2\,pb1\,pb2 - 2\,ca1\,pa1\,pa2^2\,pb1\,pb2 - pa1\,pa2^2\,pb1\,pb2\,\gamma1 - pa1^2\,pa2\,pb1\,pb2\,\gamma2 + pa1^2\,pa2^2\,pb2\,\gamma3 + pa1^2\,pa2^2\,pb1\,\gamma4\big)^2}\Big)\Big/\Big(2\,\sqrt{pa1^2\,pa2^4\,pb1^2\,pb2^2 + pa1^4\,\big(pa2^2\,pb1^2\,pb2^2 + pa2^4\,\big(pb1^2 + pb2^2\big)\big)}\Big)\Big]\Big)\Big/
\end{aligned}
$$

$$\left(4\,\text{pb1}\left(\frac{1}{\text{pa1}^2}+\frac{1}{\text{pa2}^2}+\frac{1}{\text{pb1}^2}+\frac{1}{\text{pb2}^2}\right)\sqrt{\left(2\,\text{cb2}\,\text{pa1}^2\,\text{pa2}^2\,\text{pb1}+2\,\text{cb1}\,\text{pa1}^2\,\text{pa2}^2\,\text{pb2}+2\,\text{pa1}^2\,\text{pb1}\,\text{pb2}-2\,\text{ca2}\,\text{pa1}^2\,\text{pa2}\,\text{pb1}\,\text{pb2}+2\,\text{pa2}^2\,\text{pb1}\,\text{pb2}-2\,\text{ca1}\,\text{pa1}\,\text{pa2}^2\,\text{pb1}\,\text{pb2}-\text{pa1}\,\text{pa2}^2\,\text{pb1}\,\text{pb2}\,\gamma1-\text{pa1}^2\,\text{pa2}\,\text{pb1}\,\text{pb2}\,\gamma2+\text{pa1}^2\,\text{pa2}^2\,\text{pb2}\,\gamma3+\text{pa1}^2\,\text{pa2}^2\,\text{pb1}\,\gamma4\right)^2}\right)-\left(\sqrt{\pi}\,\gamma4\left(2\,\text{cb2}\,\text{pa1}^2\,\text{pa2}^2\,\text{pb1}+2\,\text{cb1}\,\text{pa1}^2\,\text{pa2}^2\,\text{pb2}+2\,\text{pa1}^2\,\text{pb1}\,\text{pb2}-2\,\text{ca2}\,\text{pa1}^2\,\text{pa2}\,\text{pb1}\,\text{pb2}+2\,\text{pa2}^2\,\text{pb1}\,\text{pb2}-2\,\text{ca1}\,\text{pa1}\,\text{pa2}^2\,\text{pb1}\,\text{pb2}-\text{pa1}\,\text{pa2}^2\,\text{pb1}\,\text{pb2}\,\gamma1-\text{pa1}^2\,\text{pa2}\,\text{pb1}\,\text{pb2}\,\gamma2+\text{pa1}^2\,\text{pa2}^2\,\text{pb2}\,\gamma3+\text{pa1}^2\,\text{pa2}^2\,\text{pb1}\,\gamma4\right)\text{Erf}\left[\left(\sqrt{\left(2\,\text{cb2}\,\text{pa1}^2\,\text{pa2}^2\,\text{pb1}+2\,\text{cb1}\,\text{pa1}^2\,\text{pa2}^2\,\text{pb2}+2\,\text{pa1}^2\,\text{pb1}\,\text{pb2}-2\,\text{ca2}\,\text{pa1}^2\,\text{pa2}\,\text{pb1}\,\text{pb2}+2\,\text{pa2}^2\,\text{pb1}\,\text{pb2}-2\,\text{ca1}\,\text{pa1}\,\text{pa2}^2\,\text{pb1}\,\text{pb2}-\text{pa1}\,\text{pa2}^2\,\text{pb1}\,\text{pb2}\,\gamma1-\text{pa1}^2\,\text{pa2}\,\text{pb1}\,\text{pb2}\,\gamma2+\text{pa1}^2\,\text{pa2}^2\,\text{pb2}\,\gamma3+\text{pa1}^2\,\text{pa2}^2\,\text{pb1}\,\gamma4\right)^2}\right)\Big/\left(2\sqrt{\text{pa1}^2\,\text{pa2}^4\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^4\left(\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa2}^4\left(\text{pb1}^2+\text{pb2}^2\right)\right)}\right)\right]\right)\Big/\left(4\left(\frac{1}{\text{pa1}^2}+\frac{1}{\text{pa2}^2}+\frac{1}{\text{pb1}^2}+\frac{1}{\text{pb2}^2}\right)\text{pb2}\sqrt{\left(2\,\text{cb2}\,\text{pa1}^2\,\text{pa2}^2\,\text{pb1}+2\,\text{cb1}\,\text{pa1}^2\,\text{pa2}^2\,\text{pb2}+2\,\text{pa1}^2\,\text{pb1}\,\text{pb2}-2\,\text{ca2}\,\text{pa1}^2\,\text{pa2}\,\text{pb1}\,\text{pb2}+2\,\text{pa2}^2\,\text{pb1}\,\text{pb2}-2\,\text{ca1}\,\text{pa1}\,\text{pa2}^2\,\text{pb1}\,\text{pb2}-\text{pa1}\,\text{pa2}^2\,\text{pb1}\,\text{pb2}\,\gamma1-\text{pa1}^2\,\text{pa2}\,\text{pb1}\,\text{pb2}\,\gamma2+\text{pa1}^2\,\text{pa2}^2\,\text{pb2}\,\gamma3+\text{pa1}^2\,\text{pa2}^2\,\text{pb1}\,\gamma4\right)^2}\right)-\left(\sqrt{\pi}\left(-\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\left(2\,\text{ca1}+\gamma1\right)-\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\left(2\,\text{ca2}+\gamma2\right)+\text{pa1}\,\text{pa2}\left(-2\,\text{pb2}^2+\text{pb1}\,\text{pb2}^2\left(2\,\text{cb1}+\gamma3\right)+\text{pb1}^2\left(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma4\right)\right)\right)\text{Erf}\left[\left(\sqrt{\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\left(2\,\text{ca1}+\gamma1\right)+\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\left(2\,\text{ca2}+\gamma2\right)-\text{pa1}\,\text{pa2}\left(-2\,\text{pb2}^2+\text{pb1}\,\text{pb2}^2\left(2\,\text{cb1}+\gamma3\right)+\text{pb1}^2\left(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma4\right)\right)\right)^2}\right)\Big/\left(2\sqrt{\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\left(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)}\right)\right]\right)\Big/\left(2\,\text{pa1}\,\text{pa2}\,\text{pb1}^2\left(\frac{1}{\text{pa1}^2}+\frac{1}{\text{pa2}^2}+\frac{1}{\text{pb1}^2}+\frac{1}{\text{pb2}^2}\right)\text{pb2}^4\sqrt{\left(\frac{2\,\text{ca1}}{\text{pa1}}+\frac{2\,\text{ca2}}{\text{pa2}}+\frac{2}{\text{pb1}^2}-\frac{2\,\text{cb1}}{\text{pb1}}+\frac{2}{\text{pb2}^2}-\frac{2\,\text{cb2}}{\text{pb2}}+\frac{\gamma1}{\text{pa1}}+\frac{\gamma2}{\text{pa2}}-\frac{\gamma3}{\text{pb1}}-\frac{\gamma4}{\text{pb2}}\right)^2}\right)+\left(\text{cb2}\,\sqrt{\pi}\left(-\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\left(2\,\text{ca1}+\gamma1\right)-\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\left(2\,\text{ca2}+\gamma2\right)+\text{pa1}\,\text{pa2}\left(-2\,\text{pb2}^2+\text{pb1}\,\text{pb2}^2\left(2\,\text{cb1}+\gamma3\right)+\text{pb1}^2\left(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma4\right)\right)\right)\text{Erf}\left[\left(\sqrt{\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\left(2\,\text{ca1}+\gamma1\right)+\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\left(2\,\text{ca2}+\gamma2\right)-\text{pa1}\,\text{pa2}\left(-2\,\text{pb2}^2+\text{pb1}\,\text{pb2}^2\left(2\,\text{cb1}+\gamma3\right)+\text{pb1}^2\left(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma4\right)\right)\right)^2}\right)\Big/\left(2\sqrt{\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\left(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)}\right)\right]\right)\Big/\left(2\,\text{pa1}\,\text{pa2}\,\text{pb1}^2\left(\frac{1}{\text{pa1}^2}+\frac{1}{\text{pa2}^2}+\frac{1}{\text{pb1}^2}+\frac{1}{\text{pb2}^2}\right)\text{pb2}^3$$

$$\sqrt{\left(\frac{2\,ca1}{pa1}+\frac{2\,ca2}{pa2}+\frac{2}{pb1^2}-\frac{2\,cb1}{pb1}+\frac{2}{pb2^2}-\frac{2\,cb2}{pb2}+\frac{\gamma 1}{pa1}+\frac{\gamma 2}{pa2}-\frac{\gamma 3}{pb1}-\frac{\gamma 4}{pb2}\right)^2}\Bigg) -$$
$$\Bigg(\sqrt{\pi}\,\Big(-pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)-pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)+pa1\,pa2$$
$$\Big(-2\,pb2^2+pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)\,\text{Erf}\Big[$$
$$\Big(\sqrt{\Big(pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)+pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)-pa1\,pa2\,\Big(-2\,pb2^2+$$
$$pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)^2}\Big)\Big/$$
$$\Big(2\,\sqrt{pa2^2\,pb1^4\,pb2^4+pa1^2\,\Big(pb1^4\,pb2^4+pa2^2\,pb1^2\,pb2^2\,\Big(pb1^2+pb2^2\Big)\Big)}\Big)\Big]\Big)\Big/$$
$$\Bigg(2\,pa1\,pa2\,pb1^4\,\left(\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}\right)pb2^2$$
$$\sqrt{\left(\frac{2\,ca1}{pa1}+\frac{2\,ca2}{pa2}+\frac{2}{pb1^2}-\frac{2\,cb1}{pb1}+\frac{2}{pb2^2}-\frac{2\,cb2}{pb2}+\frac{\gamma 1}{pa1}+\frac{\gamma 2}{pa2}-\frac{\gamma 3}{pb1}-\frac{\gamma 4}{pb2}\right)^2}\Bigg) +$$
$$\Bigg(cb1\,\sqrt{\pi}\,\Big(-pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)-pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)+pa1$$
$$pa2\,\Big(-2\,pb2^2+pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)\,\text{Erf}\Big[$$
$$\Big(\sqrt{\Big(pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)+pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)-pa1\,pa2\,\Big(-2\,pb2^2+$$
$$pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)^2}\Big)\Big/$$
$$\Big(2\,\sqrt{pa2^2\,pb1^4\,pb2^4+pa1^2\,\Big(pb1^4\,pb2^4+pa2^2\,pb1^2\,pb2^2\,\Big(pb1^2+pb2^2\Big)\Big)}\Big)\Big]\Big)\Big/$$
$$\Bigg(2\,pa1\,pa2\,pb1^3\,\left(\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}\right)pb2^2$$
$$\sqrt{\left(\frac{2\,ca1}{pa1}+\frac{2\,ca2}{pa2}+\frac{2}{pb1^2}-\frac{2\,cb1}{pb1}+\frac{2}{pb2^2}-\frac{2\,cb2}{pb2}+\frac{\gamma 1}{pa1}+\frac{\gamma 2}{pa2}-\frac{\gamma 3}{pb1}-\frac{\gamma 4}{pb2}\right)^2}\Bigg) -$$
$$\Bigg(ca2\,\sqrt{\pi}\,\Big(-pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)-pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)+pa1$$
$$pa2\,\Big(-2\,pb2^2+pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)\,\text{Erf}\Big[$$
$$\Big(\sqrt{\Big(pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)+pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)-pa1\,pa2\,\Big(-2\,pb2^2+$$
$$pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)^2}\Big)\Big/$$
$$\Big(2\,\sqrt{pa2^2\,pb1^4\,pb2^4+pa1^2\,\Big(pb1^4\,pb2^4+pa2^2\,pb1^2\,pb2^2\,\Big(pb1^2+pb2^2\Big)\Big)}\Big)\Big]\Big)\Big/$$
$$\Bigg(2\,pa1\,pa2^2\,pb1^2\,\left(\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}\right)pb2^2$$
$$\sqrt{\left(\frac{2\,ca1}{pa1}+\frac{2\,ca2}{pa2}+\frac{2}{pb1^2}-\frac{2\,cb1}{pb1}+\frac{2}{pb2^2}-\frac{2\,cb2}{pb2}+\frac{\gamma 1}{pa1}+\frac{\gamma 2}{pa2}-\frac{\gamma 3}{pb1}-\frac{\gamma 4}{pb2}\right)^2}\Bigg) -$$
$$\Bigg(ca1\,\sqrt{\pi}\,\Big(-pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)-pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)+pa1$$
$$pa2\,\Big(-2\,pb2^2+pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)\,\text{Erf}\Big[$$
$$\Big(\sqrt{\Big(pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)+pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)-pa1\,pa2\,\Big(-2\,pb2^2+$$

$$\text{pb1}\,\text{pb2}^2\,(2\,\text{cb1}+\gamma 3)+\text{pb1}^2\,(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma 4)))^2)\Big/$$

$$\Big(2\,\sqrt{\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\,(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(\text{pb1}^2+\text{pb2}^2))}\Big)\Big]\Big)\Big/$$

$$\Big(2\,\text{pa1}^2\,\text{pa2}\,\text{pb1}^2\,\left(\frac{1}{\text{pa1}^2}+\frac{1}{\text{pa2}^2}+\frac{1}{\text{pb1}^2}+\frac{1}{\text{pb2}^2}\right)\text{pb2}^2$$

$$\sqrt{\left(\frac{2\,\text{ca1}}{\text{pa1}}+\frac{2\,\text{ca2}}{\text{pa2}}+\frac{2}{\text{pb1}^2}-\frac{2\,\text{cb1}}{\text{pb1}}+\frac{2}{\text{pb2}^2}-\frac{2\,\text{cb2}}{\text{pb2}}+\frac{\gamma 1}{\text{pa1}}+\frac{\gamma 2}{\text{pa2}}-\frac{\gamma 3}{\text{pb1}}-\frac{\gamma 4}{\text{pb2}}\right)^2}\,\Big)-$$

$$\Big(\sqrt{\pi}\,\gamma 1\,(-\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca1}+\gamma 1)-\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca2}+\gamma 2)+\text{pa1}\,\text{pa2}$$

$$(-2\,\text{pb2}^2+\text{pb1}\,\text{pb2}^2\,(2\,\text{cb1}+\gamma 3)+\text{pb1}^2\,(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma 4)))\ \text{Erf}\Big[$$

$$\Big(\sqrt{}\,\big(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca1}+\gamma 1)+\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca2}+\gamma 2)-\text{pa1}\,\text{pa2}\,(-2\,\text{pb2}^2+$$

$$\text{pb1}\,\text{pb2}^2\,(2\,\text{cb1}+\gamma 3)+\text{pb1}^2\,(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma 4)))^2)\Big/$$

$$\Big(2\,\sqrt{\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\,(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(\text{pb1}^2+\text{pb2}^2))}\Big)\Big]\Big)\Big/$$

$$\Big(4\,\text{pa1}^2\,\text{pa2}\,\text{pb1}^2\,\left(\frac{1}{\text{pa1}^2}+\frac{1}{\text{pa2}^2}+\frac{1}{\text{pb1}^2}+\frac{1}{\text{pb2}^2}\right)\text{pb2}^2$$

$$\sqrt{\left(\frac{2\,\text{ca1}}{\text{pa1}}+\frac{2\,\text{ca2}}{\text{pa2}}+\frac{2}{\text{pb1}^2}-\frac{2\,\text{cb1}}{\text{pb1}}+\frac{2}{\text{pb2}^2}-\frac{2\,\text{cb2}}{\text{pb2}}+\frac{\gamma 1}{\text{pa1}}+\frac{\gamma 2}{\text{pa2}}-\frac{\gamma 3}{\text{pb1}}-\frac{\gamma 4}{\text{pb2}}\right)^2}\,\Big)-$$

$$\Big(\sqrt{\pi}\,\gamma 2\,(-\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca1}+\gamma 1)-\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca2}+\gamma 2)+\text{pa1}\,\text{pa2}$$

$$(-2\,\text{pb2}^2+\text{pb1}\,\text{pb2}^2\,(2\,\text{cb1}+\gamma 3)+\text{pb1}^2\,(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma 4)))\ \text{Erf}\Big[$$

$$\Big(\sqrt{}\,\big(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca1}+\gamma 1)+\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca2}+\gamma 2)-\text{pa1}\,\text{pa2}\,(-2\,\text{pb2}^2+$$

$$\text{pb1}\,\text{pb2}^2\,(2\,\text{cb1}+\gamma 3)+\text{pb1}^2\,(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma 4)))^2)\Big/$$

$$\Big(2\,\sqrt{\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\,(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(\text{pb1}^2+\text{pb2}^2))}\Big)\Big]\Big)\Big/$$

$$\Big(4\,\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\left(\frac{1}{\text{pa1}^2}+\frac{1}{\text{pa2}^2}+\frac{1}{\text{pb1}^2}+\frac{1}{\text{pb2}^2}\right)\text{pb2}^2$$

$$\sqrt{\left(\frac{2\,\text{ca1}}{\text{pa1}}+\frac{2\,\text{ca2}}{\text{pa2}}+\frac{2}{\text{pb1}^2}-\frac{2\,\text{cb1}}{\text{pb1}}+\frac{2}{\text{pb2}^2}-\frac{2\,\text{cb2}}{\text{pb2}}+\frac{\gamma 1}{\text{pa1}}+\frac{\gamma 2}{\text{pa2}}-\frac{\gamma 3}{\text{pb1}}-\frac{\gamma 4}{\text{pb2}}\right)^2}\,\Big)+$$

$$\Big(\sqrt{\pi}\,\gamma 3\,(-\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca1}+\gamma 1)-\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca2}+\gamma 2)+\text{pa1}\,\text{pa2}$$

$$(-2\,\text{pb2}^2+\text{pb1}\,\text{pb2}^2\,(2\,\text{cb1}+\gamma 3)+\text{pb1}^2\,(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma 4)))\ \text{Erf}\Big[$$

$$\Big(\sqrt{}\,\big(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca1}+\gamma 1)+\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\,(2\,\text{ca2}+\gamma 2)-\text{pa1}\,\text{pa2}\,(-2\,\text{pb2}^2+$$

$$\text{pb1}\,\text{pb2}^2\,(2\,\text{cb1}+\gamma 3)+\text{pb1}^2\,(-2+2\,\text{cb2}\,\text{pb2}+\text{pb2}\,\gamma 4)))^2)\Big/$$

$$\Big(2\,\sqrt{\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\,(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(\text{pb1}^2+\text{pb2}^2))}\Big)\Big]\Big)\Big/$$

$$\Big(4\,\text{pa1}\,\text{pa2}\,\text{pb1}^3\,\left(\frac{1}{\text{pa1}^2}+\frac{1}{\text{pa2}^2}+\frac{1}{\text{pb1}^2}+\frac{1}{\text{pb2}^2}\right)\text{pb2}^2$$

$$\sqrt{\left(\frac{2\,ca1}{pa1}+\frac{2\,ca2}{pa2}+\frac{2}{pb1^2}-\frac{2\,cb1}{pb1}+\frac{2}{pb2^2}-\frac{2\,cb2}{pb2}+\frac{\gamma 1}{pa1}+\frac{\gamma 2}{pa2}-\frac{\gamma 3}{pb1}-\frac{\gamma 4}{pb2}\right)^2}\Bigg)+$$

$$\Bigg(\sqrt{\pi}\,\gamma 4\,\Big(-pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)-pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)+pa1\,pa2$$

$$\Big(-2\,pb2^2+pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)\,\text{Erf}\Big[$$

$$\Big(\sqrt{\Big(pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)+pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)-pa1\,pa2\,\Big(-2\,pb2^2+$$

$$pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)^2}\Big)\Big/$$

$$\Big(2\,\sqrt{pa2^2\,pb1^4\,pb2^4+pa1^2\,\Big(pb1^4\,pb2^4+pa2^2\,pb1^2\,pb2^2\,\Big(pb1^2+pb2^2\Big)\Big)}\Big)\Big]\Big)\Big/$$

$$\Bigg(4\,pa1\,pa2\,pb1^2\,\left(\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}\right)pb2^3$$

$$\sqrt{\left(\frac{2\,ca1}{pa1}+\frac{2\,ca2}{pa2}+\frac{2}{pb1^2}-\frac{2\,cb1}{pb1}+\frac{2}{pb2^2}-\frac{2\,cb2}{pb2}+\frac{\gamma 1}{pa1}+\frac{\gamma 2}{pa2}-\frac{\gamma 3}{pb1}-\frac{\gamma 4}{pb2}\right)^2}\Bigg)\Bigg)+$$

$$ca1\,e^{-\frac{\left(\frac{2\,ca1}{pa1}+\frac{2\,ca2}{pa2}+\frac{2}{pb1^2}-\frac{2\,cb1}{pb1}+\frac{2}{pb2^2}-\frac{2\,cb2}{pb2}+\frac{\gamma 1}{pa1}+\frac{\gamma 2}{pa2}-\frac{\gamma 3}{pb1}-\frac{\gamma 4}{pb2}\right)^2}{4\left(-\frac{1}{pa1^2}-\frac{1}{pa2^2}-\frac{1}{pb1^2}-\frac{1}{pb2^2}\right)}}$$

$$pa1$$

$$\Bigg(\Bigg(\sqrt{\pi}\,\left(1-\frac{\frac{2\,ca1}{pa1}+\frac{2\,ca2}{pa2}+\frac{2}{pb1^2}-\frac{2\,cb1}{pb1}+\frac{2}{pb2^2}-\frac{2\,cb2}{pb2}+\frac{\gamma 1}{pa1}+\frac{\gamma 2}{pa2}-\frac{\gamma 3}{pb1}-\frac{\gamma 4}{pb2}}{2\left(\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}\right)}\right)$$

$$\text{Erf}\Big[\Big(\sqrt{\Big(2\,cb2\,pa1^2\,pa2^2\,pb1+2\,cb1\,pa1^2\,pa2^2\,pb2+2\,pa1^2\,pb1\,pb2-2\,ca2\,pa1^2$$

$$pa2\,pb1\,pb2+2\,pa2^2\,pb1\,pb2-2\,ca1\,pa1\,pa2^2\,pb1\,pb2-pa1\,pa2^2\,pb1$$

$$pb2\,\gamma 1-pa1^2\,pa2\,pb1\,pb2\,\gamma 2+pa1^2\,pa2^2\,pb2\,\gamma 3+pa1^2\,pa2^2\,pb1\,\gamma 4\Big)^2}\Big)\Big/$$

$$\Big(2\,\sqrt{pa1^2\,pa2^4\,pb1^2\,pb2^2+pa1^4\,\Big(pa2^2\,pb1^2\,pb2^2+pa2^4\,\Big(pb1^2+pb2^2\Big)\Big)}\Big)\Big]\Bigg)\Big/$$

$$\Bigg(2\,\sqrt{\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}}$$

$$\sqrt{\left(1-\frac{\frac{2\,ca1}{pa1}+\frac{2\,ca2}{pa2}+\frac{2}{pb1^2}-\frac{2\,cb1}{pb1}+\frac{2}{pb2^2}-\frac{2\,cb2}{pb2}+\frac{\gamma 1}{pa1}+\frac{\gamma 2}{pa2}-\frac{\gamma 3}{pb1}-\frac{\gamma 4}{pb2}}{2\left(\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}\right)}\right)^2}\Bigg)-$$

$$\Big(pa1\,pa2\,\sqrt{pa2^2\,pb1^4\,pb2^4+pa1^2\,\Big(pb1^4\,pb2^4+pa2^2\,pb1^2\,pb2^2\,\Big(pb1^2+pb2^2\Big)\Big)}$$

$$\sqrt{\pi}\,\Big(-pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)-pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)+$$

$$pa1\,pa2\,\Big(-2\,pb2^2+pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)$$

$$\text{Erf}\Big[\Big(\sqrt{\Big(pa2\,pb1^2\,pb2^2\,(2\,ca1+\gamma 1)+pa1\,pb1^2\,pb2^2\,(2\,ca2+\gamma 2)-pa1\,pa2$$

$$\Big(-2\,pb2^2+pb1\,pb2^2\,(2\,cb1+\gamma 3)+pb1^2\,(-2+2\,cb2\,pb2+pb2\,\gamma 4)\Big)\Big)^2}\Big)\Big/$$

$$\left(2\sqrt{pa2^2\,pb1^4\,pb2^4+pa1^2\left(pb1^4\,pb2^4+pa2^2\,pb1^2\,pb2^2\left(pb1^2+pb2^2\right)\right)}\right)\Big]\Big)\Big/$$
$$\Big(2\left(pa2^2\,pb1^2\,pb2^2+pa1^2\left(pb1^2\,pb2^2+pa2^2\left(pb1^2+pb2^2\right)\right)\right)$$
$$\sqrt{\left(pa2\,pb1^2\,pb2^2\left(2\,ca1+\gamma1\right)+pa1\,pb1^2\,pb2^2\left(2\,ca2+\gamma2\right)-pa1\,pa2\right.}$$
$$\left.\left.\left(-2\,pb2^2+pb1\,pb2^2\left(2\,cb1+\gamma3\right)+pb1^2\left(-2+2\,cb2\,pb2+pb2\,\gamma4\right)\right)^2\right)\right)\Big)\Big/$$
$$\Big(pa1^2\,pa2\,pb1\,pb2\,\sqrt{\pi}\,\Big(\text{Erf}\Big[\left(-2\,pa2^2\,pb1\,pb2+pa1\,pa2^2\,pb1\,pb2\left(2\,ca1+\gamma1\right)-\right.$$
$$pa1^2\left(2\,pb1\,pb2-pa2\,pb1\,pb2\left(2\,ca2+\gamma2\right)+\right.$$
$$\left.\left.pa2^2\left(2\,cb2\,pb1+2\,cb1\,pb2+pb2\,\gamma3+pb1\,\gamma4\right)\right)\right)\Big/$$
$$\left(2\,pa1\,pa2\,\sqrt{pa2^2\,pb1^2\,pb2^2+pa1^2\left(pb1^2\,pb2^2+pa2^2\left(pb1^2+pb2^2\right)\right)}\right)\Big]-$$
$$\text{Erf}\Big[\left(pa2\,pb1^2\,pb2^2\left(2\,ca1+\gamma1\right)+pa1\,pb1^2\,pb2^2\left(2\,ca2+\gamma2\right)-\right.$$
$$pa1\,pa2$$
$$\left.\left.\left(-2\,pb2^2+pb1\,pb2^2\left(2\,cb1+\gamma3\right)+pb1^2\left(-2+2\,cb2\,pb2+pb2\,\gamma4\right)\right)\right)\Big/$$
$$\left.\left(2\,pb1\,pb2\,\sqrt{pa2^2\,pb1^2\,pb2^2+pa1^2\left(pb1^2\,pb2^2+pa2^2\left(pb1^2+pb2^2\right)\right)}\right)\Big]\right)\Big)$$

In[88]:=
```
ha1attrueconsumption = Simplify[
  ha1 /. {ca1 → ca1true * ϵ, ca2 → ca2true * ϵ, cb1 → cb1true * ϵ, cb2 → cb2true * ϵ},
  Assumptionselvis && α ≥ 0 && α ≤ 1]
```

Out[88]=

$$\Bigg(2\sqrt{pa2^2\,pb1^2\,pb2^2+pa1^2\left(pb1^2\,pb2^2+pa2^2\left(pb1^2+pb2^2\right)\right)}$$
$$\Bigg(-\frac{1}{4\sqrt{\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}}}\Bigg(\frac{2\left(-1+e^{-\frac{\left(\frac{\gamma1}{pa1}+\frac{\gamma2}{pa2}-\frac{\gamma3}{pb1}-\frac{\gamma4}{pb2}+\frac{2\,\alpha\,\epsilon}{pa1^2}+\frac{2\,\alpha\,\epsilon}{pa2^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{pb1^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{pb2^2}\right)^2}{4\left(\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}\right)}}\right)}{\sqrt{\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}}}-\Big(2\left(-1+\right.$$
$$\left.e^{-\frac{\left(pa1\,pa2^2\,pb1^2\,pb2^2\,\gamma1+2\,pa2^2\,pb1^2\,pb2^2\,(-1+\alpha\,\epsilon)+pa1^2\left(-pa2^2\,pb1\,pb2^2\,\gamma3+2\,pa2^2\,pb2^2\,(-1+\alpha)\,\epsilon+pb1^2\left(-pa2^2\,pb2\,\gamma4+2\,pa2^2\,(-1+\alpha)\,\epsilon+pb2^2\,(-2+pa2\,\gamma2+2\,\epsilon\right.\right.\right.\right.}{4\,pa1^2\,pa2^2\,pb1^2\,pb2^2\left(pa2^2\,pb1^2\,pb2^2+pa1^2\left(pb1^2\,pb2^2+pa2^2\left(pb1^2+pb2^2\right)\right)\right)}}\Big)\Big)\Big/$$
$$\left(\sqrt{\frac{1}{pa1^2}+\frac{1}{pa2^2}+\frac{1}{pb1^2}+\frac{1}{pb2^2}}\right)+$$

$$\left(2\sqrt{\pi}\left(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon+\mathrm{pa1}^2\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 2+2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon-\mathrm{pa2}^2\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)\right)\mathrm{Erf}\left[\frac{1}{2}\sqrt{\left(\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 1+\frac{2\alpha\epsilon}{\mathrm{pa1}}\right)+\mathrm{pa1}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 2+\frac{2\alpha\epsilon}{\mathrm{pa2}}\right)-\mathrm{pa1}\,\mathrm{pa2}\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)^2\Big/\left(\mathrm{pa2}^2\,\mathrm{pb1}^4\,\mathrm{pb2}^4+\mathrm{pa1}^2\left(\mathrm{pb1}^4\,\mathrm{pb2}^4+\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\mathrm{pb1}^2+\mathrm{pb2}^2\right)\right)\right)\right)\right]\Big/\left(\mathrm{pb1}^2\left(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^2\left(\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^2\left(\mathrm{pb1}^2+\mathrm{pb2}^2\right)\right)\right)\sqrt{\left(\frac{\gamma 1}{\mathrm{pa1}}+\frac{\gamma 2}{\mathrm{pa2}}-\frac{\gamma 3}{\mathrm{pb1}}-\frac{\gamma 4}{\mathrm{pb2}}+\frac{2\alpha\epsilon}{\mathrm{pa1}^2}+\frac{2\alpha\epsilon}{\mathrm{pa2}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\mathrm{pb1}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\mathrm{pb2}^2}\right)^2}\right)+$$

$$\left(2\sqrt{\pi}\left(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon+\mathrm{pa1}^2\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 2+2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon-\mathrm{pa2}^2\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)\right)\mathrm{Erf}\left[\frac{1}{2}\sqrt{\left(\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 1+\frac{2\alpha\epsilon}{\mathrm{pa1}}\right)+\mathrm{pa1}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 2+\frac{2\alpha\epsilon}{\mathrm{pa2}}\right)-\mathrm{pa1}\,\mathrm{pa2}\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)^2\Big/\left(\mathrm{pa2}^2\,\mathrm{pb1}^4\,\mathrm{pb2}^4+\mathrm{pa1}^2\left(\mathrm{pb1}^4\,\mathrm{pb2}^4+\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\mathrm{pb1}^2+\mathrm{pb2}^2\right)\right)\right)\right)\right]\Big/\left(\mathrm{pb2}^2\left(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^2\left(\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^2\left(\mathrm{pb1}^2+\mathrm{pb2}^2\right)\right)\right)\sqrt{\left(\frac{\gamma 1}{\mathrm{pa1}}+\frac{\gamma 2}{\mathrm{pa2}}-\frac{\gamma 3}{\mathrm{pb1}}-\frac{\gamma 4}{\mathrm{pb2}}+\frac{2\alpha\epsilon}{\mathrm{pa1}^2}+\frac{2\alpha\epsilon}{\mathrm{pa2}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\mathrm{pb1}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\mathrm{pb2}^2}\right)^2}\right)+$$

$$\left(\sqrt{\pi}\,\gamma 1\left(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon+\mathrm{pa1}^2\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 2+2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon-\mathrm{pa2}^2\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)\right)\mathrm{Erf}\left[\frac{1}{2}\sqrt{\left(\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 1+\frac{2\alpha\epsilon}{\mathrm{pa1}}\right)+\mathrm{pa1}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 2+\frac{2\alpha\epsilon}{\mathrm{pa2}}\right)-\mathrm{pa1}\,\mathrm{pa2}\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)^2\Big/$$

$$\left(\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\,\left(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right]\Bigg)\Bigg/$$

$$\left(\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^3\,\left(\text{pb1}^2\,\text{pb2}^2+\text{pa2}^2\,\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right.$$

$$\left.\sqrt{\left(\frac{\gamma 1}{\text{pa1}}+\frac{\gamma 2}{\text{pa2}}-\frac{\gamma 3}{\text{pb1}}-\frac{\gamma 4}{\text{pb2}}+\frac{2\,\alpha\,\epsilon}{\text{pa1}^2}+\frac{2\,\alpha\,\epsilon}{\text{pa2}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb1}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb2}^2}\right)^2}\right)+$$

$$\left(\sqrt{\pi}\,\gamma 2\,\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\alpha\,\epsilon+\right.\right.$$

$$\text{pa1}^2\,\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,\gamma 2+2\,\text{pb1}^2\,\text{pb2}^2\,\alpha\,\epsilon-\text{pa2}^2\,\left(\text{pb1}\,\text{pb2}^2\,\gamma 3-\right.\right.$$

$$\left.\left.\left.2\,\text{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\text{pb1}^2\,(-2+\text{pb2}\,\gamma 4+2\,\epsilon-2\,\alpha\,\epsilon)\right)\right)\right)\,\text{Erf}\left[\frac{1}{2}\right.$$

$$\sqrt{\left(\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,\left(\gamma 1+\frac{2\,\alpha\,\epsilon}{\text{pa1}}\right)+\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\,\left(\gamma 2+\frac{2\,\alpha\,\epsilon}{\text{pa2}}\right)-\text{pa1}\,\text{pa2}\,\left(\text{pb1}\,\text{pb2}^2\right.\right.\right.}$$

$$\left.\left.\left.\gamma 3-2\,\text{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\text{pb1}^2\,(-2+\text{pb2}\,\gamma 4+2\,\epsilon-2\,\alpha\,\epsilon)\right)\right)^2\Bigg/$$

$$\left.\left.\left(\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\,\left(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right]\right)\Bigg/$$

$$\left(\left(\text{pa2}^3\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^2\,\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2+\text{pa2}^3\,\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right.$$

$$\left.\sqrt{\left(\frac{\gamma 1}{\text{pa1}}+\frac{\gamma 2}{\text{pa2}}-\frac{\gamma 3}{\text{pb1}}-\frac{\gamma 4}{\text{pb2}}+\frac{2\,\alpha\,\epsilon}{\text{pa1}^2}+\frac{2\,\alpha\,\epsilon}{\text{pa2}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb1}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb2}^2}\right)^2}\right)-$$

$$\left(\sqrt{\pi}\,\gamma 3\,\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\alpha\,\epsilon+\right.\right.$$

$$\text{pa1}^2\,\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,\gamma 2+2\,\text{pb1}^2\,\text{pb2}^2\,\alpha\,\epsilon-\text{pa2}^2\,\left(\text{pb1}\,\text{pb2}^2\,\gamma 3-\right.\right.$$

$$\left.\left.\left.2\,\text{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\text{pb1}^2\,(-2+\text{pb2}\,\gamma 4+2\,\epsilon-2\,\alpha\,\epsilon)\right)\right)\right)\,\text{Erf}\left[\frac{1}{2}\right.$$

$$\sqrt{\left(\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,\left(\gamma 1+\frac{2\,\alpha\,\epsilon}{\text{pa1}}\right)+\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\,\left(\gamma 2+\frac{2\,\alpha\,\epsilon}{\text{pa2}}\right)-\text{pa1}\,\text{pa2}\,\left(\text{pb1}\,\text{pb2}^2\right.\right.\right.}$$

$$\left.\left.\left.\gamma 3-2\,\text{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\text{pb1}^2\,(-2+\text{pb2}\,\gamma 4+2\,\epsilon-2\,\alpha\,\epsilon)\right)\right)^2\Bigg/$$

$$\left.\left.\left(\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\,\left(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right]\right)\Bigg/$$

$$\left(\left(\text{pa2}^2\,\text{pb1}^3\,\text{pb2}^2+\text{pa1}^2\,\left(\text{pb1}^3\,\text{pb2}^2+\text{pa2}^2\,\text{pb1}\,\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right.$$

$$\left.\sqrt{\left(\frac{\gamma 1}{\text{pa1}}+\frac{\gamma 2}{\text{pa2}}-\frac{\gamma 3}{\text{pb1}}-\frac{\gamma 4}{\text{pb2}}+\frac{2\,\alpha\,\epsilon}{\text{pa1}^2}+\frac{2\,\alpha\,\epsilon}{\text{pa2}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb1}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb2}^2}\right)^2}\right)-$$

$$\left(\sqrt{\pi}\,\gamma 4\,\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\alpha\,\epsilon+\right.\right.$$

$$\mathrm{pa1}^2\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 2+2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon-\mathrm{pa2}^2\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)\mathrm{Erf}\left[\frac{1}{2}\sqrt{\left(\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 1+\frac{2\alpha\epsilon}{\mathrm{pa1}}\right)+\mathrm{pa1}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 2+\frac{2\alpha\epsilon}{\mathrm{pa2}}\right)-\mathrm{pa1}\,\mathrm{pa2}\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)^2\Big/\left(\mathrm{pa2}^2\,\mathrm{pb1}^4\,\mathrm{pb2}^4+\mathrm{pa1}^2\left(\mathrm{pb1}^4\,\mathrm{pb2}^4+\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\mathrm{pb1}^2+\mathrm{pb2}^2\right)\right)\right)\right)\right]\Big/\left(\left(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^3+\mathrm{pa1}^2\left(\mathrm{pb1}^2\,\mathrm{pb2}^3+\mathrm{pa2}^2\,\mathrm{pb2}\left(\mathrm{pb1}^2+\mathrm{pb2}^2\right)\right)\right)\sqrt{\left(\frac{\gamma 1}{\mathrm{pa1}}+\frac{\gamma 2}{\mathrm{pa2}}-\frac{\gamma 3}{\mathrm{pb1}}-\frac{\gamma 4}{\mathrm{pb2}}+\frac{2\alpha\epsilon}{\mathrm{pa1}^2}+\frac{2\alpha\epsilon}{\mathrm{pa2}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\mathrm{pb1}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\mathrm{pb2}^2}\right)^2}\right)+\left(2\sqrt{\pi}\,(-1+\alpha)\,\epsilon\left(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon+\mathrm{pa1}^2\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 2+2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon-\mathrm{pa2}^2\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)\mathrm{Erf}\left[\frac{1}{2}\sqrt{\left(\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 1+\frac{2\alpha\epsilon}{\mathrm{pa1}}\right)+\mathrm{pa1}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 2+\frac{2\alpha\epsilon}{\mathrm{pa2}}\right)-\mathrm{pa1}\,\mathrm{pa2}\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)^2\Big/\left(\mathrm{pa2}^2\,\mathrm{pb1}^4\,\mathrm{pb2}^4+\mathrm{pa1}^2\left(\mathrm{pb1}^4\,\mathrm{pb2}^4+\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\mathrm{pb1}^2+\mathrm{pb2}^2\right)\right)\right)\right)\right]\Big/\left(\mathrm{pb1}^2\left(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^2\left(\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^2\left(\mathrm{pb1}^2+\mathrm{pb2}^2\right)\right)\right)\sqrt{\left(\frac{\gamma 1}{\mathrm{pa1}}+\frac{\gamma 2}{\mathrm{pa2}}-\frac{\gamma 3}{\mathrm{pb1}}-\frac{\gamma 4}{\mathrm{pb2}}+\frac{2\alpha\epsilon}{\mathrm{pa1}^2}+\frac{2\alpha\epsilon}{\mathrm{pa2}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\mathrm{pb1}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\mathrm{pb2}^2}\right)^2}\right)+\left(2\sqrt{\pi}\,(-1+\alpha)\,\epsilon\left(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon+\mathrm{pa1}^2\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 2+2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\alpha\epsilon-\mathrm{pa2}^2\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)\mathrm{Erf}\left[\frac{1}{2}\sqrt{\left(\left(\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 1+\frac{2\alpha\epsilon}{\mathrm{pa1}}\right)+\mathrm{pa1}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\gamma 2+\frac{2\alpha\epsilon}{\mathrm{pa2}}\right)-\mathrm{pa1}\,\mathrm{pa2}\left(\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\mathrm{pb1}^2\,(-2+\mathrm{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)^2\Big/\left(\mathrm{pa2}^2\,\mathrm{pb1}^4\,\mathrm{pb2}^4+\mathrm{pa1}^2\left(\mathrm{pb1}^4\,\mathrm{pb2}^4+\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\left(\mathrm{pb1}^2+\mathrm{pb2}^2\right)\right)\right)\right)\right]\Big/$$

$$\left(\text{pb2}^2\left(\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^2\left(\text{pb1}^2\,\text{pb2}^2+\text{pa2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right.$$

$$\left.\sqrt{\left(\frac{\gamma 1}{\text{pa1}}+\frac{\gamma 2}{\text{pa2}}-\frac{\gamma 3}{\text{pb1}}-\frac{\gamma 4}{\text{pb2}}+\frac{2\,\alpha\,\epsilon}{\text{pa1}^2}+\frac{2\,\alpha\,\epsilon}{\text{pa2}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb1}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb2}^2}\right)^2}\right)+$$

$$\left(2\sqrt{\pi}\,\alpha\,\epsilon\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\alpha\,\epsilon+\right.\right.$$

$$\text{pa1}^2\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,\gamma 2+2\,\text{pb1}^2\,\text{pb2}^2\,\alpha\,\epsilon-\text{pa2}^2\left(\text{pb1}\,\text{pb2}^2\,\gamma 3-\right.\right.$$

$$\left.\left.\left.2\,\text{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\text{pb1}^2\,(-2+\text{pb2}\,\gamma 4+2\,\epsilon-2\,\alpha\,\epsilon)\right)\right)\right)\text{Erf}\left[\frac{1}{2}\right.$$

$$\left.\sqrt{\left(\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\left(\gamma 1+\frac{2\,\alpha\,\epsilon}{\text{pa1}}\right)+\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\left(\gamma 2+\frac{2\,\alpha\,\epsilon}{\text{pa2}}\right)-\text{pa1}\,\text{pa2}\left(\text{pb1}\,\text{pb2}^2\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\gamma 3-2\,\text{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\text{pb1}^2\,(-2+\text{pb2}\,\gamma 4+2\,\epsilon-2\,\alpha\,\epsilon)\right)\right)^2\Big/\right.$$

$$\left.\left.\left.\left(\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\left(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right)\right]\Bigg)\Big/$$

$$\left(\text{pa1}^2\left(\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^2\left(\text{pb1}^2\,\text{pb2}^2+\text{pa2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right.$$

$$\left.\sqrt{\left(\frac{\gamma 1}{\text{pa1}}+\frac{\gamma 2}{\text{pa2}}-\frac{\gamma 3}{\text{pb1}}-\frac{\gamma 4}{\text{pb2}}+\frac{2\,\alpha\,\epsilon}{\text{pa1}^2}+\frac{2\,\alpha\,\epsilon}{\text{pa2}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb1}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb2}^2}\right)^2}\right)+$$

$$\left(2\sqrt{\pi}\,\alpha\,\epsilon\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\alpha\,\epsilon+\right.\right.$$

$$\text{pa1}^2\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\,\gamma 2+2\,\text{pb1}^2\,\text{pb2}^2\,\alpha\,\epsilon-\text{pa2}^2\left(\text{pb1}\,\text{pb2}^2\,\gamma 3-\right.\right.$$

$$\left.\left.\left.2\,\text{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\text{pb1}^2\,(-2+\text{pb2}\,\gamma 4+2\,\epsilon-2\,\alpha\,\epsilon)\right)\right)\right)\text{Erf}\left[\frac{1}{2}\right.$$

$$\left.\sqrt{\left(\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\left(\gamma 1+\frac{2\,\alpha\,\epsilon}{\text{pa1}}\right)+\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\left(\gamma 2+\frac{2\,\alpha\,\epsilon}{\text{pa2}}\right)-\text{pa1}\,\text{pa2}\left(\text{pb1}\,\text{pb2}^2\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\gamma 3-2\,\text{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\text{pb1}^2\,(-2+\text{pb2}\,\gamma 4+2\,\epsilon-2\,\alpha\,\epsilon)\right)\right)^2\Big/\right.$$

$$\left.\left.\left.\left(\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\left(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right)\right]\Bigg)\Big/$$

$$\left(\text{pa2}^2\left(\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^2\left(\text{pb1}^2\,\text{pb2}^2+\text{pa2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right.$$

$$\left.\sqrt{\left(\frac{\gamma 1}{\text{pa1}}+\frac{\gamma 2}{\text{pa2}}-\frac{\gamma 3}{\text{pb1}}-\frac{\gamma 4}{\text{pb2}}+\frac{2\,\alpha\,\epsilon}{\text{pa1}^2}+\frac{2\,\alpha\,\epsilon}{\text{pa2}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb1}^2}+\frac{2+2\,(-1+\alpha)\,\epsilon}{\text{pb2}^2}\right)^2}\right)+$$

$$\left(2\,\text{pa1}^2\,\text{pa2}^2\,\text{pb1}^2\,\sqrt{\pi}\,\left(-\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1-2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\,\epsilon)+\right.\right.$$

$$\text{pa1}^2\left(\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3-2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\,\epsilon+\right.$$

$$\left.\left.\left.\text{pb1}^2\left(\text{pa2}^2\,\text{pb2}\,\gamma 4-2\,\text{pa2}^2\,(-1+\alpha)\,\epsilon-\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\,\alpha\,\epsilon)\right)\right)\right)$$

$$\mathrm{Erf}\Big[\frac{1}{2\,pb1\,pb2}\Big(\sqrt{\Big(\big(pa1\,pa2^2\,pb1^2\,pb2^2\,\gamma1+2\,pa2^2\,pb1^2\,pb2^2\,(-1+\alpha\epsilon)+pa1^2\big(-pa2^2\,pb1\,pb2^2\,\gamma3+2\,pa2^2\,pb2^2\,(-1+\alpha)\epsilon+pb1^2\big(-pa2^2\,pb2\,\gamma4+2\,pa2^2\,(-1+\alpha)\epsilon+pb2^2\,(-2+pa2\,\gamma2+2\,\alpha\epsilon)\big)\big)\big)^2\Big/\big(pa1^2\,pa2^4\,pb1^2\,pb2^2+pa1^4\big(pa2^2\,pb1^2\,pb2^2+pa2^4\big(pb1^2+pb2^2\big)\big)\big)\big)\Big]\Big)\Big/\Big(\big(pa2^2\,pb1^2\,pb2^2+pa1^2\big(pb1^2\,pb2^2+pa2^2\big(pb1^2+pb2^2\big)\big)\big)\sqrt{\big(pa1\,pa2^2\,pb1^2\,pb2^2\,\gamma1+2\,pa2^2\,pb1^2\,pb2^2\,(-1+\alpha\epsilon)+pa1^2\big(-pa2^2\,pb1\,pb2^2\,\gamma3+2\,pa2^2\,pb2^2\,(-1+\alpha)\epsilon+pb1^2\big(-pa2^2\,pb2\,\gamma4+2\,pa2^2\,(-1+\alpha)\epsilon+pb2^2\,(-2+pa2\,\gamma2+2\,\alpha\epsilon)\big)\big)\big)^2}+\Big(2\,pa1^2\,pa2^2\,pb2^2\,\sqrt{\pi}\,\big(-pa1\,pa2^2\,pb1^2\,pb2^2\,\gamma1-2\,pa2^2\,pb1^2\,pb2^2\,(-1+\alpha\epsilon)+pa1^2\big(pa2^2\,pb1\,pb2^2\,\gamma3-2\,pa2^2\,pb2^2\,(-1+\alpha)\epsilon+pb1^2\big(pa2^2\,pb2\,\gamma4-2\,pa2^2\,(-1+\alpha)\epsilon-pb2^2\,(-2+pa2\,\gamma2+2\,\alpha\epsilon)\big)\big)\big)\mathrm{Erf}\Big[\frac{1}{2\,pb1\,pb2}\Big(\sqrt{\Big(\big(pa1\,pa2^2\,pb1^2\,pb2^2\,\gamma1+2\,pa2^2\,pb1^2\,pb2^2\,(-1+\alpha\epsilon)+pa1^2\big(-pa2^2\,pb1\,pb2^2\,\gamma3+2\,pa2^2\,pb2^2\,(-1+\alpha)\epsilon+pb1^2\big(-pa2^2\,pb2\,\gamma4+2\,pa2^2\,(-1+\alpha)\epsilon+pb2^2\,(-2+pa2\,\gamma2+2\,\alpha\epsilon)\big)\big)\big)^2\Big/\big(pa1^2\,pa2^4\,pb1^2\,pb2^2+pa1^4\big(pa2^2\,pb1^2\,pb2^2+pa2^4\big(pb1^2+pb2^2\big)\big)\big)\big)\Big]\Big)\Big/\Big(\big(pa2^2\,pb1^2\,pb2^2+pa1^2\big(pb1^2\,pb2^2+pa2^2\big(pb1^2+pb2^2\big)\big)\big)\sqrt{\big(pa1\,pa2^2\,pb1^2\,pb2^2\,\gamma1+2\,pa2^2\,pb1^2\,pb2^2\,(-1+\alpha\epsilon)+pa1^2\big(-pa2^2\,pb1\,pb2^2\,\gamma3+2\,pa2^2\,pb2^2\,(-1+\alpha)\epsilon+pb1^2\big(-pa2^2\,pb2\,\gamma4+2\,pa2^2\,(-1+\alpha)\epsilon+pb2^2\,(-2+pa2\,\gamma2+2\,\alpha\epsilon)\big)\big)\big)^2}+\Big(pa1\,pa2^2\,pb1^2\,pb2^2\,\sqrt{\pi}\,\gamma1\,\big(-pa1\,pa2^2\,pb1^2\,pb2^2\,\gamma1-2\,pa2^2\,pb1^2\,pb2^2\,(-1+\alpha\epsilon)+pa1^2\big(pa2^2\,pb1\,pb2^2\,\gamma3-2\,pa2^2\,pb2^2\,(-1+\alpha)\epsilon+pb1^2\big(pa2^2\,pb2\,\gamma4-2\,pa2^2\,(-1+\alpha)\epsilon-pb2^2\,(-2+pa2\,\gamma2+2\,\alpha\epsilon)\big)\big)\big)\mathrm{Erf}\Big[\frac{1}{2\,pb1\,pb2}\Big(\sqrt{\Big(\big(pa1\,pa2^2\,pb1^2\,pb2^2\,\gamma1+2\,pa2^2\,pb1^2\,pb2^2\,(-1+\alpha\epsilon)+pa1^2\big(-pa2^2\,pb1\,pb2^2\,\gamma3+2\,pa2^2\,pb2^2\,(-1+\alpha)\epsilon+pb1^2\big(-pa2^2\,pb2\,\gamma4+2\,pa2^2\,(-1+\alpha)\epsilon+pb2^2\,(-2+pa2\,\gamma2+2\,\alpha\epsilon)\big)\big)\big)^2\Big/\big(pa1^2\,pa2^4\,pb1^2\,pb2^2+pa1^4\big(pa2^2\,pb1^2\,pb2^2+pa2^4\big(pb1^2+pb2^2\big)\big)\big)\big)\Big]\Big)\Big/\Big(\big(pa2^2\,pb1^2\,pb2^2+pa1^2\big(pb1^2\,pb2^2+pa2^2\big(pb1^2+pb2^2\big)\big)\big)\sqrt{\big(pa1\,pa2^2\,pb1^2\,pb2^2\,\gamma1+2\,pa2^2\,pb1^2\,pb2^2\,(-1+\alpha\epsilon)+pa1^2\big(-pa2^2\,pb1\,pb2^2\,\gamma3+2\,pa2^2\,pb2^2\,(-1+\alpha)\epsilon+pb1^2\big(-pa2^2\,pb2\,\gamma4+2\,pa2^2\,(-1+\alpha)\epsilon+pb2^2\,(-2+pa2\,\gamma2+2\,\alpha\epsilon)\big)\big)\big)^2}+$$

$$\Bigg(\mathrm{pa1}^2\,\mathrm{pa2}\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\sqrt{\pi}\,\gamma 2\,\Big(-\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1-2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,(-1+\alpha\,\epsilon)+\mathrm{pa1}^2\,\Big(\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3-2\,\mathrm{pa2}^2\,\mathrm{pb2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb1}^2\,\Big(\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma 4-2\,\mathrm{pa2}^2\,(-1+\alpha)\,\epsilon-\mathrm{pb2}^2\,(-2+\mathrm{pa2}\,\gamma 2+2\,\alpha\,\epsilon)\Big)\Big)\Big)\,\mathrm{Erf}\Big[\frac{1}{2\,\mathrm{pb1}\,\mathrm{pb2}}\Big(\sqrt{\Big(\big(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,(-1+\alpha\,\epsilon)+\mathrm{pa1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3+2\,\mathrm{pa2}^2\,\mathrm{pb2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma 4+2\,\mathrm{pa2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb2}^2\,(-2+\mathrm{pa2}\,\gamma 2+2\,\alpha\,\epsilon)\Big)\Big)\big)^2\Big/\big(\mathrm{pa1}^2\,\mathrm{pa2}^4\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^4\,\big(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^4\,\big(\mathrm{pb1}^2+\mathrm{pb2}^2\big)\big)\big)\Big)}\Big]\Bigg)\Big/\Big(\big(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^2\,\big(\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^2\,\big(\mathrm{pb1}^2+\mathrm{pb2}^2\big)\big)\big)\,\sqrt{\Big(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,(-1+\alpha\,\epsilon)+\mathrm{pa1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3+2\,\mathrm{pa2}^2\,\mathrm{pb2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma 4+2\,\mathrm{pa2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb2}^2\,(-2+\mathrm{pa2}\,\gamma 2+2\,\alpha\,\epsilon)\Big)\Big)\Big)^2\Big)+$$

$$\Bigg(\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}^2\,\sqrt{\pi}\,\gamma 3\,\Big(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,(-1+\alpha\,\epsilon)+\mathrm{pa1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3+2\,\mathrm{pa2}^2\,\mathrm{pb2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma 4+2\,\mathrm{pa2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb2}^2\,(-2+\mathrm{pa2}\,\gamma 2+2\,\alpha\,\epsilon)\Big)\Big)\Big)\,\mathrm{Erf}\Big[\frac{1}{2\,\mathrm{pb1}\,\mathrm{pb2}}\Big(\sqrt{\Big(\big(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,(-1+\alpha\,\epsilon)+\mathrm{pa1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3+2\,\mathrm{pa2}^2\,\mathrm{pb2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma 4+2\,\mathrm{pa2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb2}^2\,(-2+\mathrm{pa2}\,\gamma 2+2\,\alpha\,\epsilon)\Big)\Big)\big)^2\Big/\big(\mathrm{pa1}^2\,\mathrm{pa2}^4\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^4\,\big(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^4\,\big(\mathrm{pb1}^2+\mathrm{pb2}^2\big)\big)\big)\Big)}\Big]\Bigg)\Big/\Big(\big(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^2\,\big(\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^2\,\big(\mathrm{pb1}^2+\mathrm{pb2}^2\big)\big)\big)\,\sqrt{\Big(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,(-1+\alpha\,\epsilon)+\mathrm{pa1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3+2\,\mathrm{pa2}^2\,\mathrm{pb2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma 4+2\,\mathrm{pa2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb2}^2\,(-2+\mathrm{pa2}\,\gamma 2+2\,\alpha\,\epsilon)\Big)\Big)\Big)^2\Big)+$$

$$\Bigg(\mathrm{pa1}^2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}\,\sqrt{\pi}\,\gamma 4\,\Big(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,(-1+\alpha\,\epsilon)+\mathrm{pa1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3+2\,\mathrm{pa2}^2\,\mathrm{pb2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma 4+2\,\mathrm{pa2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb2}^2\,(-2+\mathrm{pa2}\,\gamma 2+2\,\alpha\,\epsilon)\Big)\Big)\Big)\,\mathrm{Erf}\Big[\frac{1}{2\,\mathrm{pb1}\,\mathrm{pb2}}\Big(\sqrt{\Big(\big(\mathrm{pa1}\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,\gamma 1+2\,\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2\,(-1+\alpha\,\epsilon)+\mathrm{pa1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb1}\,\mathrm{pb2}^2\,\gamma 3+2\,\mathrm{pa2}^2\,\mathrm{pb2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb1}^2\,\Big(-\mathrm{pa2}^2\,\mathrm{pb2}\,\gamma 4+2\,\mathrm{pa2}^2\,(-1+\alpha)\,\epsilon+\mathrm{pb2}^2\,(-2+\mathrm{pa2}\,\gamma 2+2\,\alpha\,\epsilon)\Big)\Big)\big)^2\Big/\big(\mathrm{pa1}^2\,\mathrm{pa2}^4\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^4\,\big(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^4\,\big(\mathrm{pb1}^2+\mathrm{pb2}^2\big)\big)\big)\Big)}\Big]\Bigg)\Big/\Big(\big(\mathrm{pa2}^2\,\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa1}^2\,\big(\mathrm{pb1}^2\,\mathrm{pb2}^2+\mathrm{pa2}^2\,\big(\mathrm{pb1}^2+\mathrm{pb2}^2\big)\big)\big)$$

$$\sqrt{\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\,\alpha\epsilon)\right)\right)\right)^2}-\left(2\,\text{pa1}^2\,\text{pa2}^2\,\text{pb1}^2\,\sqrt{\pi}\,(-1+\alpha)\epsilon\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\,\alpha\epsilon)\right)\right)\right)\text{Erf}\left[\frac{1}{2\,\text{pb1}\,\text{pb2}}\left(\sqrt{\left(\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\,\alpha\epsilon)\right)\right)\right)^2\Big/\left(\text{pa1}^2\,\text{pa2}^4\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^4\left(\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa2}^4\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right)\right]\right)\Big/\left(\left(\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^2\left(\text{pb1}^2\,\text{pb2}^2+\text{pa2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\sqrt{\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\,\alpha\epsilon)\right)\right)\right)^2}-\left(2\,\text{pa1}^2\,\text{pa2}^2\,\text{pb2}^2\,\sqrt{\pi}\,(-1+\alpha)\epsilon\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\,\alpha\epsilon)\right)\right)\right)\text{Erf}\left[\frac{1}{2\,\text{pb1}\,\text{pb2}}\left(\sqrt{\left(\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\,\alpha\epsilon)\right)\right)\right)^2\Big/\left(\text{pa1}^2\,\text{pa2}^4\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^4\left(\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa2}^4\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right)\right]\right)\Big/\left(\left(\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^2\left(\text{pb1}^2\,\text{pb2}^2+\text{pa2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\sqrt{\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\,\alpha\epsilon)\right)\right)\right)^2}-\left(2\,\text{pa1}^2\,\text{pb1}^2\,\text{pb2}^2\,\sqrt{\pi}\,\alpha\epsilon\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\,\alpha\epsilon)\right)\right)\right)\text{Erf}\left[\frac{1}{2\,\text{pb1}\,\text{pb2}}\left(\sqrt{\left(\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\,\alpha\epsilon)\right)\right)\right)^2\Big/$$

$$\left(\text{pa1}^2\ \text{pa2}^4\ \text{pb1}^2\ \text{pb2}^2 + \text{pa1}^4\ \left(\text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2 + \text{pa2}^4\ \left(\text{pb1}^2 + \text{pb2}^2\right)\right)\right)\right]\Bigg)\Big/$$

$$\Big(\left(\text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2 + \text{pa1}^2\ \left(\text{pb1}^2\ \text{pb2}^2 + \text{pa2}^2\ \left(\text{pb1}^2 + \text{pb2}^2\right)\right)\right)$$
$$\sqrt{\left(\text{pa1}\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ \gamma 1 + 2\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ (-1+\alpha\epsilon) + \right.}$$
$$\text{pa1}^2\ \left(-\text{pa2}^2\ \text{pb1}\ \text{pb2}^2\ \gamma 3 + 2\ \text{pa2}^2\ \text{pb2}^2\ (-1+\alpha)\ \epsilon + \right.$$
$$\left.\left.\text{pb1}^2\ \left(-\text{pa2}^2\ \text{pb2}\ \gamma 4 + 2\ \text{pa2}^2\ (-1+\alpha)\ \epsilon + \text{pb2}^2\ (-2 + \text{pa2}\ \gamma 2 + 2\ \alpha\epsilon)\right)\right)\right)^2\Big) -$$
$$\Bigg(2\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ \sqrt{\pi}\ \alpha\epsilon\ \left(\text{pa1}\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ \gamma 1 + 2\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ (-1+\alpha\epsilon) + \right.$$
$$\text{pa1}^2\ \left(-\text{pa2}^2\ \text{pb1}\ \text{pb2}^2\ \gamma 3 + 2\ \text{pa2}^2\ \text{pb2}^2\ (-1+\alpha)\ \epsilon + \right.$$
$$\left.\left.\text{pb1}^2\ \left(-\text{pa2}^2\ \text{pb2}\ \gamma 4 + 2\ \text{pa2}^2\ (-1+\alpha)\ \epsilon + \text{pb2}^2\ (-2 + \text{pa2}\ \gamma 2 + 2\ \alpha\epsilon)\right)\right)\right)$$
$$\text{Erf}\Big[\frac{1}{2\ \text{pb1}\ \text{pb2}}\Big(\sqrt{\Big(\left(\text{pa1}\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ \gamma 1 + 2\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ (-1+\alpha\epsilon) + \right.}$$
$$\text{pa1}^2\ \left(-\text{pa2}^2\ \text{pb1}\ \text{pb2}^2\ \gamma 3 + 2\ \text{pa2}^2\ \text{pb2}^2\ (-1+\alpha)\ \epsilon + \text{pb1}^2\ \left(-\text{pa2}^2\ \text{pb2}\ \gamma 4 + \right.\right.$$
$$\left.\left.\left.2\ \text{pa2}^2\ (-1+\alpha)\ \epsilon + \text{pb2}^2\ (-2 + \text{pa2}\ \gamma 2 + 2\ \alpha\epsilon)\right)\right)\right)^2\Big)\Big/$$
$$\left(\text{pa1}^2\ \text{pa2}^4\ \text{pb1}^2\ \text{pb2}^2 + \text{pa1}^4\ \left(\text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2 + \text{pa2}^4\ \left(\text{pb1}^2 + \text{pb2}^2\right)\right)\right)\Big]\Bigg)\Big/$$
$$\Big(\left(\text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2 + \text{pa1}^2\ \left(\text{pb1}^2\ \text{pb2}^2 + \text{pa2}^2\ \left(\text{pb1}^2 + \text{pb2}^2\right)\right)\right)$$
$$\sqrt{\left(\text{pa1}\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ \gamma 1 + 2\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ (-1+\alpha\epsilon) + \right.}$$
$$\text{pa1}^2\ \left(-\text{pa2}^2\ \text{pb1}\ \text{pb2}^2\ \gamma 3 + 2\ \text{pa2}^2\ \text{pb2}^2\ (-1+\alpha)\ \epsilon + \text{pb1}^2\right.$$
$$\left.\left.\left.\left(-\text{pa2}^2\ \text{pb2}\ \gamma 4 + 2\ \text{pa2}^2\ (-1+\alpha)\ \epsilon + \text{pb2}^2\ (-2 + \text{pa2}\ \gamma 2 + 2\ \alpha\epsilon)\right)\right)\right)^2\right)\Bigg) +$$
$$\Bigg(\sqrt{\pi}\ \alpha\epsilon\ \Big(\Big(\left(\text{pa1}\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ \gamma 1 + 2\ \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ \alpha\epsilon + \text{pa1}^2\right.$$
$$\left(\text{pa2}\ \text{pb1}^2\ \text{pb2}^2\ \gamma 2 + 2\ \text{pb1}^2\ \text{pb2}^2\ \alpha\epsilon - \text{pa2}^2\ \left(\text{pb1}\ \text{pb2}^2\ \gamma 3 - \right.\right.$$
$$\left.\left.\left.2\ \text{pb2}^2\ (1 + (-1+\alpha)\ \epsilon) + \text{pb1}^2\ (-2 + \text{pb2}\ \gamma 4 + 2\ \epsilon - 2\ \alpha\epsilon)\right)\right)\Big)$$
$$\text{Erf}\Big[\frac{1}{2}\sqrt{\Big(\Big(\text{pa2}\ \text{pb1}^2\ \text{pb2}^2\ \left(\gamma 1 + \frac{2\ \alpha\epsilon}{\text{pa1}}\right) + \text{pa1}\ \text{pb1}^2\ \text{pb2}^2\ \left(\gamma 2 + \frac{2\ \alpha\epsilon}{\text{pa2}}\right) - \right.}$$
$$\text{pa1}\ \text{pa2}\ \left(\text{pb1}\ \text{pb2}^2\ \gamma 3 - 2\ \text{pb2}^2\ (1 + (-1+\alpha)\ \epsilon) + \right.$$
$$\left.\left.\text{pb1}^2\ (-2 + \text{pb2}\ \gamma 4 + 2\ \epsilon - 2\ \alpha\epsilon)\right)\Big)^2\Big/\ \left(\text{pa2}^2\ \text{pb1}^4\ \text{pb2}^4 + \right.$$
$$\left.\left.\text{pa1}^2\ \left(\text{pb1}^4\ \text{pb2}^4 + \text{pa2}^2\ \text{pb1}^2\ \text{pb2}^2\ \left(\text{pb1}^2 + \text{pb2}^2\right)\right)\right)\Big]\Big]\Big)\Big/$$

$$\left(\sqrt{\left(\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\left(\gamma 1+\frac{2\alpha\epsilon}{\text{pa1}}\right)+\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\left(\gamma 2+\frac{2\alpha\epsilon}{\text{pa2}}\right)-\text{pa1}\,\text{pa2}\left(\text{pb1}\,\text{pb2}^2\right.\right.\right.\right.$$
$$\left.\left.\left.\left.\gamma 3-2\,\text{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\text{pb1}^2\,(-2+\text{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)^2\Big/\right.$$
$$\left.\left.\left(\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa1}^2\left(\text{pb1}^4\,\text{pb2}^4+\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right)\right)-$$
$$\left(\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\right.\right.$$
$$\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\,\epsilon+\right.$$
$$\left.\left.\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\,\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\alpha\epsilon)\right)\right)\right)$$
$$\text{Erf}\left[\frac{1}{2\,\text{pb1}\,\text{pb2}}\left(\sqrt{\left(\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\right.\right.\right.\right.$$
$$\text{pa1}^2\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\,\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\right.\right.$$
$$\left.\left.\left.\left.\gamma 4+2\,\text{pa2}^2\,(-1+\alpha)\,\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\alpha\epsilon)\right)\right)\right)^2\Big/$$
$$\left.\left.\left.\left.\left(\text{pa1}^2\,\text{pa2}^4\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^4\left(\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa2}^4\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right)\right)\right]\right)\Big/$$
$$\left(\sqrt{\left(\left(\text{pa1}\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,\gamma 1+2\,\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2\,(-1+\alpha\epsilon)+\text{pa1}^2\right.\right.\right.$$
$$\left(-\text{pa2}^2\,\text{pb1}\,\text{pb2}^2\,\gamma 3+2\,\text{pa2}^2\,\text{pb2}^2\,(-1+\alpha)\,\epsilon+\text{pb1}^2\left(-\text{pa2}^2\,\text{pb2}\,\gamma 4+\right.\right.$$
$$\left.\left.\left.\left.2\,\text{pa2}^2\,(-1+\alpha)\,\epsilon+\text{pb2}^2\,(-2+\text{pa2}\,\gamma 2+2\alpha\epsilon)\right)\right)\right)^2\Big/\left(\text{pa1}^2\,\text{pa2}^4\right.$$
$$\left.\left.\left.\left.\text{pb1}^4\,\text{pb2}^4+\text{pa1}^4\left(\text{pa2}^2\,\text{pb1}^4\,\text{pb2}^4+\text{pa2}^4\,\text{pb1}^2\,\text{pb2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right)\right)\right)\Big/$$
$$\left.\left.\left(2\left(\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^2\left(\text{pb1}^2\,\text{pb2}^2+\text{pa2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)\right)\right)\right)\Big/\left(\text{pa1}^2\right.\right.$$

$$\text{pa2}\,\text{pb1}\,\text{pb2}$$
$$\sqrt{\pi}$$
$$\left(-\text{Erf}\left[\right.\right.$$
$$\left(\text{pa2}\,\text{pb1}^2\,\text{pb2}^2\left(\gamma 1+\frac{2\alpha\epsilon}{\text{pa1}}\right)+\right.$$
$$\text{pa1}\,\text{pb1}^2\,\text{pb2}^2\left(\gamma 2+\frac{2\alpha\epsilon}{\text{pa2}}\right)-$$
$$\left.\text{pa1}\,\text{pa2}\left(\text{pb1}\,\text{pb2}^2\,\gamma 3-2\,\text{pb2}^2\,(1+(-1+\alpha)\,\epsilon)+\text{pb1}^2\,(-2+\text{pb2}\,\gamma 4+2\epsilon-2\alpha\epsilon)\right)\right)\Big/$$
$$\left.\left(2\,\text{pb1}\,\text{pb2}\,\sqrt{\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^2\left(\text{pb1}^2\,\text{pb2}^2+\text{pa2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)}\right)\right]+$$

$$\text{Erf}\left[\left(-2\,\text{pa2}^2\,\text{pb1}\,\text{pb2}+\text{pa2}^2\,\text{pb1}\,\text{pb2}\,(\text{pa1}\,\gamma 1+2\,\alpha\,\epsilon)-\text{pa1}^2\left(2\,\text{pb1}\,\text{pb2}-\text{pb1}\,\text{pb2}\,(\text{pa2}\,\gamma 2+2\,\alpha\,\epsilon)+\text{pa2}^2\left(\text{pb1}\,\gamma 4-\frac{2\,\text{pb1}\,(-1+\alpha)\,\epsilon}{\text{pb2}}+\text{pb2}\left(\gamma 3-\frac{2\,(-1+\alpha)\,\epsilon}{\text{pb1}}\right)\right)\right)\right)\Big/\left(2\,\text{pa1}\,\text{pa2}\,\sqrt{\text{pa2}^2\,\text{pb1}^2\,\text{pb2}^2+\text{pa1}^2\left(\text{pb1}^2\,\text{pb2}^2+\text{pa2}^2\left(\text{pb1}^2+\text{pb2}^2\right)\right)}\right)\right]\Bigg)$$

- For this simple example we fix a deterministic price sequence for all the sample, in real samples we can have random prices but this keeps things simple.

In[57]:=
```
ha1attrueconsumptionpknot =
 Simplify[ha1attrueconsumption /. {pa1 → 1, pb1 → 2, pa2 → 2, pb2 → 1}]
```

Out[57]=

$$\left(8\sqrt{10}\left(1-e^{-\frac{1}{40}(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)+\right.$$

$$8\sqrt{10}\left(-1+e^{-\frac{1}{40}(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)-\left(8\sqrt{\pi}\,\gamma1\,(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\right.$$

$$\left.\mathrm{Erf}\left[\frac{1}{2\sqrt{10}}\left(\sqrt{(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)\right]\right)\Big/$$

$$\left(\sqrt{(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)-\left(4\sqrt{\pi}\,\gamma2\,(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\right.$$

$$\left.\mathrm{Erf}\left[\frac{1}{2\sqrt{10}}\left(\sqrt{(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)\right]\right)\Big/$$

$$\left(\sqrt{(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)-\left(4\sqrt{\pi}\,\gamma3\,(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\right.$$

$$\left.\mathrm{Erf}\left[\frac{1}{2\sqrt{10}}\left(\sqrt{(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)\right]\right)\Big/$$

$$\left(\sqrt{(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)-\left(8\sqrt{\pi}\,\gamma4\,(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\right.$$

$$\left.\mathrm{Erf}\left[\frac{1}{2\sqrt{10}}\left(\sqrt{(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)\right]\right)\Big/$$

$$\left(\sqrt{(-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)+$$

$$\left(8\sqrt{\pi}\,\gamma1\,(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\,\mathrm{Erf}\left[\frac{\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}}{2\sqrt{10}}\right]\right)\Big/$$

$$\left(\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)+$$

$$\left(4\sqrt{\pi}\,\gamma2\,(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\,\mathrm{Erf}\left[\frac{\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}}{2\sqrt{10}}\right]\right)\Big/$$

$$\left(\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)+$$

$$\left(4\sqrt{\pi}\,\gamma3\,(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\,\mathrm{Erf}\left[\frac{\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}}{2\sqrt{10}}\right]\right)\Big/$$

$$\left(\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)+$$

$$\left(8\sqrt{\pi}\,\gamma4\,(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\,\mathrm{Erf}\left[\frac{\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}}{2\sqrt{10}}\right]\right)\Big/$$

$$\left.\left(\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}\right)\right)\Big/$$

$$\left.\left(40\sqrt{\pi}\left(-\mathrm{Erf}\left[\frac{-10+2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon}{2\sqrt{10}}\right]+\mathrm{Erf}\left[\frac{2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon}{2\sqrt{10}}\right]\right)\right)\right)$$

- This is a function that obtains E[h(\gamma)] which then you can use for the optimization stage.

In[89]:=
```
Expectationha1gamma[γval1_, γval2_, γval3_, γval4_] := NIntegrate[
  (ha1attrueconsumptionpknot /. {γ1 → γval1, γ2 → γval2, γ3 → γval3, γ4 → γval4}),
  {α, 0, 1}, {ϵ, 0.9, 1.1}]
```

- We illustrate the use of the function evaluating it at some γ={1,1,1,0.1}

In[90]:=
```
Expectationha1gamma[1, 1, 1, 0.1]
```

Out[90]=
```
0.0264676
```

- Minimize the (E[h(\gamma))^2 with respect to γ. There are some regions of the Euclidean space where the moment is not defined this may be an issue of the prior, but overall it does not affect our conclusion here. But it's worth checking.

In[91]:=
```
NMinimize[(Expectationha1gamma[γ1, γ2, γ3, γ4])^2, {γ1, γ2, γ3, γ4}]
```

NIntegrate: The integrand $\frac{8\sqrt{10}\left(1-e^{-\frac{1}{40}\text{Power}[\ll2\gg]}\right)+\ll12\gg+\frac{8\sqrt{\pi}\,\gamma4\,(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\,\text{Erf}\left[\frac{\sqrt{\text{Plus}[\ll5\gg]^2}}{2\sqrt{10}}\right]}{\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}}}{40\sqrt{\pi}\left(-\text{Erf}\left[\frac{-10+\text{Times}[\ll2\gg]+\gamma2+\gamma3+\text{Times}[\ll2\gg]+\text{Times}[\ll3\gg]}{2\sqrt{10}}\right]+\text{Erf}\left[\frac{2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon}{2\sqrt{10}}\right]\right)}$ has evaluated to non−numerical values for all sampling points in the region with boundaries {{0, 1}, {0.9, 1.1}}.

NIntegrate: The integrand $\frac{8\sqrt{10}\left(1-e^{-\frac{1}{40}\text{Power}[\ll2\gg]}\right)+\ll12\gg+\frac{8\sqrt{\pi}\,\gamma4\,(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\,\text{Erf}\left[\frac{\sqrt{\text{Plus}[\ll5\gg]^2}}{2\sqrt{10}}\right]}{\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}}}{40\sqrt{\pi}\left(-\text{Erf}\left[\frac{-10+\text{Times}[\ll2\gg]+\gamma2+\gamma3+\text{Times}[\ll2\gg]+\text{Times}[\ll3\gg]}{2\sqrt{10}}\right]+\text{Erf}\left[\frac{2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon}{2\sqrt{10}}\right]\right)}$ has evaluated to non−numerical values for all sampling points in the region with boundaries {{0, 1}, {0.9, 1.1}}.

NIntegrate: The integrand $\frac{8\sqrt{10}\left(1-e^{-\frac{1}{40}\text{Power}[\ll2\gg]}\right)+\ll12\gg+\frac{8\sqrt{\pi}\,\gamma4\,(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)\,\text{Erf}\left[\frac{\sqrt{\text{Plus}[\ll5\gg]^2}}{2\sqrt{10}}\right]}{\sqrt{(2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon)^2}}}{40\sqrt{\pi}\left(-\text{Erf}\left[\frac{-10+\text{Times}[\ll2\gg]+\gamma2+\gamma3+\text{Times}[\ll2\gg]+\text{Times}[\ll3\gg]}{2\sqrt{10}}\right]+\text{Erf}\left[\frac{2\gamma1+\gamma2+\gamma3+2\gamma4+10\alpha\epsilon}{2\sqrt{10}}\right]\right)}$ has evaluated to non−numerical values for all sampling points in the region with boundaries {{0, 1}, {0.9, 1.1}}.

General: Further output of NIntegrate::inumr will be suppressed during this calculation.

Out[91]=
$\{3.88207\times10^{-10}, \{\gamma1\to0.0092729, \gamma2\to-0.0769732, \gamma3\to0.802497, \gamma4\to-0.369445\}\}$

- The output above shows the minimized value that is numerically zero, this is what we wanted because we wrote down the observed data such that the moments are satisfied.