In[60]:=
```
(*-----------------------------------------------*)
(*Expression for Length Constant, depends on x though*)
(*-----------------------------------------------*)
```

In[61]:=
```
sigma[x_] = ((4 * (muz + (g * x)) * nu) / (K * (nu + muz + (g * x))))^0.5
```

Out[61]=
$$2.\left(\frac{\text{nu}\,(\text{muz}+\text{g x})}{\text{K}\,(\text{muz}+\text{nu}+\text{g x})}\right)^{0.5}$$

In[62]:=

```
(*-----------------------------------------------*)
(*Expression for w_x*)
(*-----------------------------------------------*)
```

In[63]:=
```
w[x_] = -((T * x) / (4 * (nu + muz + (g * x)))) +
  ((T * sigma[x] * sinh[x / sigma[x]]) / (4 * (nu + muz + (g * x)) * cosh[L / sigma[x]]))
```

Out[63]=
$$-\frac{\text{T x}}{4\,(\text{muz}+\text{nu}+\text{g x})}+\frac{0.5\,\text{T}\left(\frac{\text{nu}\,(\text{muz}+\text{g x})}{\text{K}\,(\text{muz}+\text{nu}+\text{g x})}\right)^{0.5}\sinh\left[\frac{0.5\,\text{x}}{\left(\frac{\text{nu}\,(\text{muz}+\text{g x})}{\text{K}\,(\text{muz}+\text{nu}+\text{g x})}\right)^{0.5}}\right]}{(\text{muz}+\text{nu}+\text{g x})\,\cosh\left[\frac{0.5\,\text{L}}{\left(\frac{\text{nu}\,(\text{muz}+\text{g x})}{\text{K}\,(\text{muz}+\text{nu}+\text{g x})}\right)^{0.5}}\right]}$$

In[64]:=

```
(*-----------------------------------------------*)
(*Expression for first derivative of w_x*)
(*-----------------------------------------------*)
```

In[65]:=

```
w'[x_]
```

Out[65]=

$$\frac{g\,T\,x\_}{4\,(muz+nu+g\,x\_)^2}-\frac{T}{4\,(muz+nu+g\,x\_)}-\frac{0.5\,g\,T\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]}{\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\,(muz+nu+g\,x\_)^2}+$$

$$\frac{0.25\,T\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]}{\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}(muz+nu+g\,x\_)}+$$

$$\left(0.125\,L\,T\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)\right.$$

$$\left.\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Bigg/$$

$$\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]^2\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.}(muz+nu+g\,x\_)\right)+$$

$$\left(0.5\,T\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}\left(\frac{0.5}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}-\frac{0.25\,x\_\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.5}}\right)\right.$$

$$\left.\sinh'\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Bigg/\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right](muz+nu+g\,x\_)\right)$$

In[66]:=

```
(*-----------------------------------------------*)
(*Expression for first derivative of w_x*)
(*-----------------------------------------------*)

w''[x_]
```

Out[66]=

$$-\frac{g^2\,T\,x\_}{2\,(muz+nu+g\,x\_)^3}+\frac{g\,T}{2\,(muz+nu+g\,x\_)^2}+\frac{1.\,g^2\,T\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]}{\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\,(muz+nu+g\,x\_)^3}+$$

$$\frac{0.25\,T\left(\frac{2\,g^2\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^3}-\frac{2\,g^2\,nu}{K\,(muz+nu+g\,x\_)^2}\right)\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]}{\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}(muz+nu+g\,x\_)}-$$

$$\frac{0.5\,g\,T\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]}{\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}(muz+nu+g\,x\_)^2}-$$

$$\frac{0.125\,T\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)^2\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]}{\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.5}(muz+nu+g\,x\_)}+$$

$$\left(0.125\,L\,T\left(\frac{2\,g^2\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^3}-\frac{2\,g^2\,nu}{K\,(muz+nu+g\,x\_)^2}\right)\right.$$

$$\left.\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Big/$$

$$\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]^2\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.}(muz+nu+g\,x\_)\right)-$$

$$\left(0.25\,g\,L\,T\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)\right.$$

$$\left.\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Big/$$

$$\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]^2\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.}(muz+nu+g\,x\_)^2\right)-$$

$$\left(0.0625\,L\,T\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)^2\right.$$

$$\left.\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Big/$$

$$\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]^2\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{2.}(muz+nu+g\,x\_)\right)+$$

$$\left(0.0625\,L^2\,T\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)^2\right.$$

$$\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]^2\Bigg)\Bigg/$$

$$\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]^3\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{2.5}(muz+nu+g\,x\_)\right)-$$

$$\left(1.\,g\,T\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}\left(\frac{0.5}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}-\frac{0.25\,x\_\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.5}}\right)\right.$$

$$\left.\sinh'\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Bigg/\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right](muz+nu+g\,x\_)^2\right)+$$

$$\left(0.5\,T\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)\right.$$

$$\left.\left(\frac{0.5}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}-\frac{0.25\,x\_\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.5}}\right)\sinh'\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Bigg/$$

$$\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}(muz+nu+g\,x\_)\right)+$$

$$\left(0.5\,T\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}\left(-\frac{0.25\,x\_\left(\frac{2\,g^2\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^3}-\frac{2\,g^2\,nu}{K\,(muz+nu+g\,x\_)^2}\right)}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.5}}-\right.\right.$$

$$\left.\left.\frac{0.5\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.5}}+\frac{0.375\,x\_\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)^2}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{2.5}}\right)\right.$$

$$\left.\sinh'\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Bigg/\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right](muz+nu+g\,x\_)\right)+$$

$$\left(0.25\,L\,T\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)\right.$$

$$\left.\left(\frac{0.5}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}-\frac{0.25\,x\_\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.5}}\right)\right.$$

$$\left.\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\sinh'\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Bigg/$$

$$\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]^2\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.}(muz+nu+g\,x\_)\right)-$$

$$\left(0.03125\,L^2\,T\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)^2\right.$$

$$\left.\sinh\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\cosh''\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Big/$$

$$\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]^2\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{2.5}(muz+nu+g\,x\_)\right)+$$

$$\left(0.5\,T\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}\left(\frac{0.5}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}-\frac{0.25\,x\_\left(-\frac{g\,nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x\_)}\right)}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{1.5}}\right)^2\right.$$

$$\left.\sinh''\left[\frac{0.5\,x\_}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right]\right)\Big/\left(\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x\_)}{K\,(muz+nu+g\,x\_)}\right)^{0.5}}\right](muz+nu+g\,x\_)\right)$$

In[67]:=
```
(*-------------------------------------------*)
(* Expression for u_x - w_x *)
(*-------------------------------------------*)
```

In[68]:=
```
f[x_] = (-4 / K) * (muz + g * x) * w''[x] + (-4 * g / K) * w'[x]
```

Out[68]=
$$-\frac{1}{K}4\,g\left(\frac{g\,T\,x}{4\,(muz+nu+g\,x)^2}-\frac{T}{4\,(muz+nu+g\,x)}-\frac{0.5\,g\,T\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}{(muz+nu+g\,x)^2\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}+\right.$$

$$\frac{0.25\,T\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}(muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}+$$

$$\left(0.125\,L\,T\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\cosh'\left[\right.\right.$$

$$\left.\left.\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)\Big/\left(\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.}(muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]^2\right)+$$

$$\left(0.5\,T\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}\left(\frac{0.5}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}-\frac{0.25\,x\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.5}}\right)\right.$$

$$\left.\sinh'\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)\Bigg/\left((muz+nu+g\,x)\,\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)-$$

$$\frac{1}{K}4\,(muz+g\,x)\left(-\frac{g^2\,T\,x}{2\,(muz+nu+g\,x)^3}+\frac{g\,T}{2\,(muz+nu+g\,x)^2}+\right.$$

$$\frac{1.\,g^2\,T\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}{(muz+nu+g\,x)^3\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}+$$

$$\frac{0.25\,T\left(\frac{2\,g^2\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^3}-\frac{2\,g^2\,nu}{K\,(muz+nu+g\,x)^2}\right)\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}(muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}-$$

$$\frac{0.5\,g\,T\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}(muz+nu+g\,x)^2\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}-$$

$$\frac{0.125\,T\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)^2\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.5}(muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]}+$$

$$\left(0.125\,L\,T\left(\frac{2\,g^2\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^3}-\frac{2\,g^2\,nu}{K\,(muz+nu+g\,x)^2}\right)\right.$$

$$\left.\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)\Bigg/$$

$$\left(\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.}(muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]^2\right)-$$

$$\left(0.25\,g\,L\,T\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)\right.$$

$$\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\Bigg/$$

$$\left(\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.}(muz+nu+g\,x)^{2}\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]^{2}\right)-$$

$$\left(0.0625\,L\,T\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^{2}}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)^{2}\right.$$

$$\left.\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)\Bigg/$$

$$\left(\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{2.}(muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]^{2}\right)+$$

$$\left(0.0625\,L^{2}\,T\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^{2}}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)^{2}\right.$$

$$\left.\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]^{2}\right)\Bigg/$$

$$\left(\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{2.5}(muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]^{3}\right)-$$

$$\left(1.\,g\,T\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}\left(\frac{0.5}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}-\frac{0.25\,x\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^{2}}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.5}}\right)\right.$$

$$\left.\sinh'\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)\Bigg/\left((muz+nu+g\,x)^{2}\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]+\right.$$

$$\left(0.5\,T\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^{2}}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)\right.$$

$$\left.\left(\frac{0.5}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}-\frac{0.25\,x\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^{2}}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.5}}\right)\sinh'\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)\Bigg/$$

$$\left(\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}(muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)+$$

$$\left(0.5\,T\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}\left(-\frac{0.25\,x\left(\frac{2\,g^2\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^3}-\frac{2\,g^2\,nu}{K\,(muz+nu+g\,x)^2}\right)}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.5}}-\right.\right.$$

$$\left.\left.\frac{0.5\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.5}}+\frac{0.375\,x\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)^2}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{2.5}}\right)$$

$$\sinh'\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\Bigg/\left((muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)+$$

$$\left(0.25\,L\,T\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)\right.$$

$$\left(\frac{0.5}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}-\frac{0.25\,x\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.5}}\right)$$

$$\left.\cosh'\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\sinh'\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)\Bigg/$$

$$\left(\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.}(muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]^2\right)-$$

$$\left(0.03125\,L^2\,T\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)^2\right.$$

$$\left.\sinh\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\cosh''\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)\Bigg/$$

$$\left(\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{2.5}(muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]^2\right)+$$

$$\left(0.5\,T\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}\left(\frac{0.5}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}-\frac{0.25\,x\left(-\frac{g\,nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)^2}+\frac{g\,nu}{K\,(muz+nu+g\,x)}\right)}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{1.5}}\right)^2\right.$$

$$\left.\left.\sinh''\left[\frac{0.5\,x}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\Bigg/\left((muz+nu+g\,x)\cosh\left[\frac{0.5\,L}{\left(\frac{nu\,(muz+g\,x)}{K\,(muz+nu+g\,x)}\right)^{0.5}}\right]\right)\right)$$