Step 1: Deducing an analytical expression for M(t).
a) When t0 < t < -t2 then we expand 1/sqrt(...).

```
> restart;
> Digits :=5;
```

$$Digits := 5$$

```
> odi1
  :=H1/(sqrt(H1^2+(H-H0)^2))*exp(-(t-t0)/T)*xi*(((H0+alpha*t0)*(alph
  a*t0)+H1^2)/sqrt(H1^2+alpha^2*t0^2)+(1/T)*exp(-t0/T)*int((exp(t1/T
  ))*(alpha^2*t1^2+alpha*H0*t1+H1^2)*(-1/(alpha*t1)*(1-H1^2/(2*alpha
  ^2*t1^2)+3*H1^4/(8*alpha^4*t1^4))),t1=t0..t));
```

$$odi1 := H1\,\mathbf{e}^{\left(-\frac{t-t0}{T}\right)}\,\xi\,\Bigl(\frac{(H0+\alpha\,t0)\,\alpha\,t0+H1^2}{\sqrt{H1^2+\alpha^2\,t0^2}}+\mathbf{e}^{\left(-\frac{t0}{T}\right)}\Bigl(\Bigl(\Bigl(-\mathbf{e}^{\left(\frac{t}{T}\right)}\,\alpha^6\,T^5\,t^5+\mathbf{e}^{\left(\frac{t}{T}\right)}\,\alpha^6\,T^6\,t^4$$

$$+\frac{1}{2}\,\mathrm{Ei}\left(1,-\frac{t}{T}\right)H1^2\,t^4\,\alpha^4\,T^4-\frac{1}{16}\,H1^4\,t^2\,\alpha^2\,T^4\,\mathbf{e}^{\left(\frac{t}{T}\right)}-\frac{1}{16}\,H1^4\,t^3\,\alpha^2\,T^3\,\mathbf{e}^{\left(\frac{t}{T}\right)}$$

$$-\frac{1}{16}\,H1^4\,t^4\,\alpha^2\,T^2\,\mathrm{Ei}\left(1,-\frac{t}{T}\right)-\mathbf{e}^{\left(\frac{t}{T}\right)}\,\alpha^5\,H0\,T^5\,t^4-\frac{1}{2}\,H0\,H1^2\,t^3\,\alpha^3\,T^4\,\mathbf{e}^{\left(\frac{t}{T}\right)}$$

$$-\frac{1}{2}\,H0\,H1^2\,t^4\,\alpha^3\,T^3\,\mathrm{Ei}\left(1,-\frac{t}{T}\right)+\frac{1}{8}\,H0\,H1^4\,t\,\alpha\,T^4\,\mathbf{e}^{\left(\frac{t}{T}\right)}+\frac{1}{16}\,H0\,H1^4\,t^2\,\alpha\,T^3\,\mathbf{e}^{\left(\frac{t}{T}\right)}$$

$$+\frac{1}{16}\,H0\,H1^4\,t^3\,\alpha\,T^2\,\mathbf{e}^{\left(\frac{t}{T}\right)}+\frac{1}{16}\,H0\,H1^4\,t^4\,\alpha\,T\,\mathrm{Ei}\left(1,-\frac{t}{T}\right)+\frac{3}{32}\,H1^6\,\mathbf{e}^{\left(\frac{t}{T}\right)}\,T^4+\frac{1}{32}\,H1^6\,\mathbf{e}^{\left(\frac{t}{T}\right)}\,T^3\,t$$

$$+\frac{1}{64}\,H1^6\,T^2\,\mathbf{e}^{\left(\frac{t}{T}\right)}\,t^2+\frac{1}{64}\,H1^6\,\mathbf{e}^{\left(\frac{t}{T}\right)}\,T\,t^3+\frac{1}{64}\,H1^6\,\mathrm{Ei}\left(1,-\frac{t}{T}\right)t^4\Bigr)\Big/\left(t^4\,\alpha^5\,T^4\right)+\Bigl(\mathbf{e}^{\left(\frac{t0}{T}\right)}\,\alpha^6\,T^5\,t0^5$$

$$-\mathbf{e}^{\left(\frac{t0}{T}\right)}\,\alpha^6\,T^6\,t0^4-\frac{1}{2}\,\mathrm{Ei}\left(1,-\frac{t0}{T}\right)H1^2\,t0^4\,\alpha^4\,T^4+\frac{1}{16}\,H1^4\,t0^2\,\alpha^2\,T^4\,\mathbf{e}^{\left(\frac{t0}{T}\right)}+\frac{1}{16}\,H1^4\,t0^3\,\alpha^2\,T^3\,\mathbf{e}^{\left(\frac{t0}{T}\right)}$$

$$+\frac{1}{16}\,H1^4\,t0^4\,\alpha^2\,T^2\,\mathrm{Ei}\left(1,-\frac{t0}{T}\right)+\mathbf{e}^{\left(\frac{t0}{T}\right)}\,\alpha^5\,H0\,T^5\,t0^4+\frac{1}{2}\,H0\,H1^2\,t0^3\,\alpha^3\,T^4\,\mathbf{e}^{\left(\frac{t0}{T}\right)}$$

$$+\frac{1}{2}\,H0\,H1^2\,t0^4\,\alpha^3\,T^3\,\mathrm{Ei}\left(1,-\frac{t0}{T}\right)-\frac{1}{8}\,H0\,H1^4\,t0\,\alpha\,T^4\,\mathbf{e}^{\left(\frac{t0}{T}\right)}-\frac{1}{16}\,H0\,H1^4\,t0^2\,\alpha\,T^3\,\mathbf{e}^{\left(\frac{t0}{T}\right)}$$

$$-\frac{1}{16}\,H0\,H1^4\,t0^3\,\alpha\,T^2\,\mathbf{e}^{\left(\frac{t0}{T}\right)}-\frac{1}{16}\,H0\,H1^4\,t0^4\,\alpha\,T\,\mathrm{Ei}\left(1,-\frac{t0}{T}\right)-\frac{3}{32}\,H1^6\,\mathbf{e}^{\left(\frac{t0}{T}\right)}\,T^4-\frac{1}{32}\,H1^6\,\mathbf{e}^{\left(\frac{t0}{T}\right)}\,T^3\,t0$$

$$-\frac{1}{64} H1^6 T^2 \mathbf{e}^{\left(\frac{t0}{T}\right)} t0^2 - \frac{1}{64} H1^6 \mathbf{e}^{\left(\frac{t0}{T}\right)} T\, t0^3 - \frac{1}{64} H1^6 \operatorname{Ei}\left(1, -\frac{t0}{T}\right) t0^4 \Bigg) \Big/ (t0^4 \alpha^5 T^4) \Bigg) / T \Bigg) \Big/$$

$$\sqrt{H1^2 + H^2 - 2\, H\, H0 + H0^2}$$

```
> bcons1 :=t=(H-H0)/alpha, t0=-4.5, t2=0.2, xi=3.47*10^(-9), t1=4.5,
  alpha=1.2;
```

$$bcons1 := t = \frac{H - H0}{\alpha},\ t0 = \text{-4.5},\ t2 = .2,\ \xi = .34700\ 10^{-8},\ t1 = 4.5,\ \alpha = 1.2$$

```
> eve1 :=subs(bcons1,odi1);
```

$$eve1 := .34700\ 10^{-8}\ H1\ \mathbf{e}^{\left(-\frac{.83333\, H - .83333\, H0 + 4.5}{T}\right)} \left(\frac{-5.40\, H0 + 29.160 + H1^2}{\sqrt{H1^2 + 29.160}} + \mathbf{e}^{\left(\frac{4.5}{T}\right)} \Bigg(.83333 \Bigg(\right.$$

$$-1.2\ \%2\ T^5 (H - H0)^5 + 1.44\ \%2\ T^6 (H - H0)^4 + \frac{1}{2} \%1\ H1^2 (H - H0)^4 T^4$$

$$-\frac{1}{16} H1^4 (H - H0)^2 T^4 \%2 - .052083\ H1^4 (H - H0)^3 T^3 \%2 - .043403\ H1^4 (H - H0)^4 T^2 \%1$$

$$- 1.2\ \%2\ H0\ T^5 (H - H0)^4 - \frac{1}{2} H0\ H1^2 (H - H0)^3 T^4 \%2 - .41667\ H0\ H1^2 (H - H0)^4 T^3 \%1$$

$$+ \frac{1}{8} H0\ H1^4 (H - H0)\, T^4 \%2 + .052083\ H0\ H1^4 (H - H0)^2 T^3 \%2$$

$$+ .043403\ H0\ H1^4 (H - H0)^3 T^2 \%2 + .036169\ H0\ H1^4 (H - H0)^4 T\ \%1 + \frac{3}{32} H1^6 \%2\ T^4$$

$$+ .026042\ H1^6 \%2\ T^3 (H - H0) + .010851\ H1^6 T^2 \%2\ (H - H0)^2$$

$$+ .0090422\ H1^6 \%2\ T\, (H - H0)^3 + .0075352\ H1^6 \%1\ (H - H0)^4 \Bigg) \Big/ ((H - H0)^4 T^4) +$$

$$.00098000 \left(-5510.1\ \mathbf{e}^{\left(-\frac{4.5}{T}\right)} T^5 - 1224.4\ \mathbf{e}^{\left(-\frac{4.5}{T}\right)} T^6 - 425.15 \operatorname{Ei}\left(1, \frac{4.5}{T}\right) H1^2 T^4 \right.$$

$$+ 1.8225\ H1^4 T^4 \mathbf{e}^{\left(-\frac{4.5}{T}\right)} - 8.2012\ H1^4 T^3 \mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 36.906\ H1^4 T^2 \operatorname{Ei}\left(1, \frac{4.5}{T}\right)$$

$$+ 1020.4\ \mathbf{e}^{\left(-\frac{4.5}{T}\right)} H0\ T^5 - 78.733\ H0\ H1^2 T^4 \mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 354.29\ H0\ H1^2 T^3 \operatorname{Ei}\left(1, \frac{4.5}{T}\right)$$

$$+ .67500\ H0\ H1^4 T^4 \mathbf{e}^{\left(-\frac{4.5}{T}\right)} - 1.5187\ H0\ H1^4 T^3 \mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 6.8344\ H0\ H1^4 T^2 \mathbf{e}^{\left(-\frac{4.5}{T}\right)}$$

$$- 30.755\, H0\, H1^4\, T\, \mathrm{Ei}\left(1, \frac{4.5}{T}\right) - \frac{3}{32} H1^6\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} T^4 + .14063\, H1^6\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} T^3$$

$$- .31641\, H1^6\, T^2\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 1.4238\, H1^6\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} T - 6.4072\, H1^6\, \mathrm{Ei}\left(1, \frac{4.5}{T}\right)\Bigg) \Big/ T^4 \Bigg) / T \Bigg) \Big/$$

$$\sqrt{H1^2 + H^2 - 2\, H\, H0 + H0^2}$$

$$\%1 := \mathrm{Ei}\left(1, -.83333 \frac{H - H0}{T}\right)$$

$$\%2 := \mathbf{e}^{\left(.83333 \frac{H - H0}{T}\right)}$$

```
> bcons12 :=H0=21.60, H1=0.1, T=2;
```

$$bcons12 := H0 = 21.60, H1 = .1, T = 2$$

```
> mil1 :=eval(subs(bcons12,eve1));
```

$$mil1 := .34700\ 10^{-9}\, \mathbf{e}^{(-.41667\, H + 6.7500)} (-2.396 + .24708\, (-38.4\ \%1\, (H - 21.60)^5$$

$$- 737.28\ \%1\, (H - 21.60)^4 - .63987\, \mathrm{Ei}(1, -.41667\, H + 9.0000)\, (H - 21.60)^4$$

$$+ .00080004\, (H - 21.60)^2\ \%1 - 1.7277\, (H - 21.60)^3\ \%1 + .0043202\, (H - 21.60)\ \%1$$

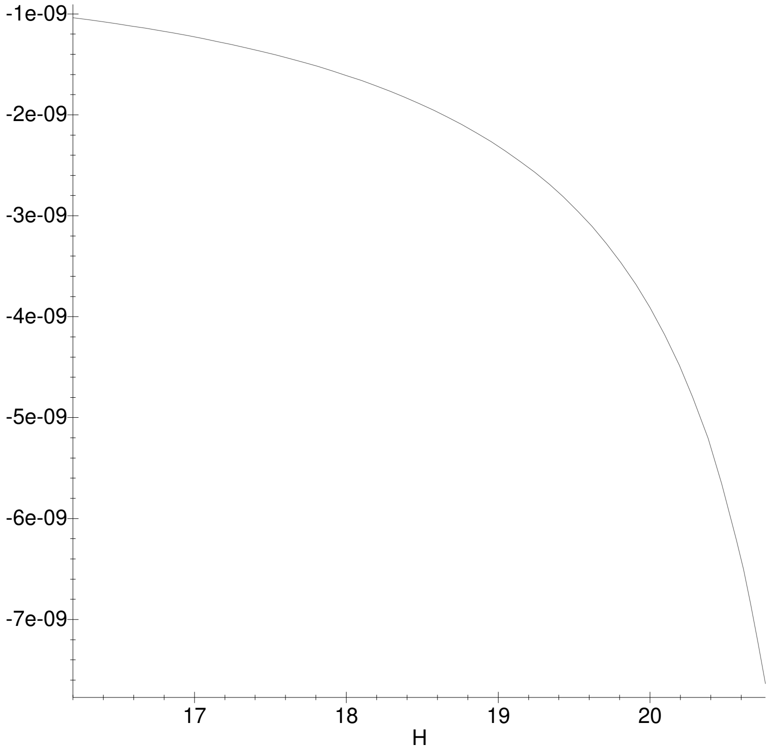
$$+ .15000\ 10^{-5}\ \%1) \Big/ (H - 21.60)^4) \Big/ \sqrt{466.57 + H^2 - 43.20\, H}$$

$$\%1 := \mathbf{e}^{(.41667\, H - 9.0000)}$$

```
> Ei(1,-.41667*H+9.0000);
```

$$\mathrm{Ei}(1, -.41667\, H + 9.0000)$$

```
> plot(mil1,H=16.2..20.76,color=red);
```




```
> odi2:=H1/(sqrt(H1^2+(H-H0)^2))*exp(-(t-t0)/T)*xi*(((H0+alpha*t0)*(
  alpha*t0)+H1^2)/sqrt(H1^2+alpha^2*t0^2)+(1/T)*exp(-t0/T)*int((exp(
  t1/T))*(alpha^2*t1^2+alpha*H0*t1+H1^2)*(-1/(alpha*t1)*(1-H1^2/(2*a
  lpha^2*t1^2)+3*H1^4/(8*alpha^4*t1^4))),t1=t0..-t2)+(1/T)*(exp(-t0/
  T))*int((1+t1/T+t1^2/(2*T^2))*(alpha^2*t1^2+alpha*H0*t1+H1^2)/sqrt
  (H1^2+alpha^2*t1^2),t1=-t2..t));
```

$$odi2 := H1\, \mathbf{e}^{\left(-\frac{t-t0}{T}\right)} \xi \left(\frac{(H0+\alpha\, t0)\,\alpha\, t0 + H1^2}{\sqrt{H1^2+\alpha^2\, t0^2}} + \mathbf{e}^{\left(-\frac{t0}{T}\right)} \left(\left(\left(t2^5\, \alpha^6\, T^5 + \alpha^6\, T^6\, t2^4 \right.\right.\right.\right.$$

$$+ \frac{1}{2} \operatorname{Ei}\left(1, \frac{t2}{T}\right) H1^2\, \mathbf{e}^{\left(\frac{t2}{T}\right)} \alpha^4\, t2^4\, T^4 - \frac{1}{16} H1^4\, \alpha^2\, t2^2\, T^4 + \frac{1}{16} H1^4\, \alpha^2\, t2^3\, T^3$$

$$- \frac{1}{16} H1^4 \operatorname{Ei}\left(1, \frac{t2}{T}\right) \mathbf{e}^{\left(\frac{t2}{T}\right)} \alpha^2\, t2^4\, T^2 - T^5\, H0\, \alpha^5\, t2^4 + \frac{1}{2} H0\, H1^2\, \alpha^3\, t2^3\, T^4$$

$$- \frac{1}{2} H0\, H1^2 \operatorname{Ei}\left(1, \frac{t2}{T}\right) \mathbf{e}^{\left(\frac{t2}{T}\right)} \alpha^3\, t2^4\, T^3 - \frac{1}{8} H0\, H1^4\, \alpha\, t2\, T^4 + \frac{1}{16} H0\, H1^4\, \alpha\, t2^2\, T^3$$

$$-\frac{1}{16} H0\, H1^4\, \alpha\, t2^3\, T^2 + \frac{1}{16} H0\, H1^4\, \mathrm{Ei}\Big(1, \frac{t2}{T}\Big)\, \mathbf{e}^{\left(\frac{t2}{T}\right)}\, \alpha\, t2^4\, T + \frac{3}{32} H1^6\, T^4 - \frac{1}{32} H1^6\, t2\, T^3$$

$$+\frac{1}{64} H1^6\, t2^2\, T^2 - \frac{1}{64} H1^6\, t2^3\, T + \frac{1}{64} H1^6\, \mathrm{Ei}\Big(1, \frac{t2}{T}\Big)\, \mathbf{e}^{\left(\frac{t2}{T}\right)}\, t2^4 \Big)\, \mathbf{e}^{\left(-\frac{t2}{T}\right)} \Big/ (\alpha^5\, t2^4\, T^4) + \Big($$

$$\mathbf{e}^{\left(\frac{t0}{T}\right)}\, \alpha^6\, T^5\, t0^5 - \mathbf{e}^{\left(\frac{t0}{T}\right)}\, \alpha^6\, T^6\, t0^4 - \frac{1}{2} \mathrm{Ei}\Big(1, -\frac{t0}{T}\Big)\, H1^2\, t0^4\, \alpha^4\, T^4 + \frac{1}{16} H1^4\, t0^2\, \alpha^2\, T^4\, \mathbf{e}^{\left(\frac{t0}{T}\right)}$$

$$+\frac{1}{16} H1^4\, t0^3\, \alpha^2\, T^3\, \mathbf{e}^{\left(\frac{t0}{T}\right)} + \frac{1}{16} H1^4\, t0^4\, \alpha^2\, T^2\, \mathrm{Ei}\Big(1, -\frac{t0}{T}\Big) + \mathbf{e}^{\left(\frac{t0}{T}\right)}\, \alpha^5\, H0\, T^5\, t0^4$$

$$+\frac{1}{2} H0\, H1^2\, t0^3\, \alpha^3\, T^4\, \mathbf{e}^{\left(\frac{t0}{T}\right)} + \frac{1}{2} H0\, H1^2\, t0^4\, \alpha^3\, T^3\, \mathrm{Ei}\Big(1, -\frac{t0}{T}\Big) - \frac{1}{8} H0\, H1^4\, t0\, \alpha\, T^4\, \mathbf{e}^{\left(\frac{t0}{T}\right)}$$

$$-\frac{1}{16} H0\, H1^4\, t0^2\, \alpha\, T^3\, \mathbf{e}^{\left(\frac{t0}{T}\right)} - \frac{1}{16} H0\, H1^4\, t0^3\, \alpha\, T^2\, \mathbf{e}^{\left(\frac{t0}{T}\right)} - \frac{1}{16} H0\, H1^4\, t0^4\, \alpha\, T\, \mathrm{Ei}\Big(1, -\frac{t0}{T}\Big)$$

$$-\frac{3}{32} H1^6\, \mathbf{e}^{\left(\frac{t0}{T}\right)}\, T^4 - \frac{1}{32} H1^6\, \mathbf{e}^{\left(\frac{t0}{T}\right)}\, T^3\, t0 - \frac{1}{64} H1^6\, T^2\, \mathbf{e}^{\left(\frac{t0}{T}\right)}\, t0^2 - \frac{1}{64} H1^6\, \mathbf{e}^{\left(\frac{t0}{T}\right)}\, T\, t0^3$$

$$-\frac{1}{64} H1^6\, \mathrm{Ei}\Big(1, -\frac{t0}{T}\Big)\, t0^4 \Big) \Big/ (t0^4\, \alpha^5\, T^4) \Big) / T + \mathbf{e}^{\left(-\frac{t0}{T}\right)} \Big(-\frac{1}{48} (-6\, t^3 \sqrt{H1^2 + \alpha^2 t^2}\, \alpha^3 \sqrt{\alpha^2}$$

$$-24\, t \sqrt{H1^2 + \alpha^2 t^2}\, T^2 \alpha^3 \sqrt{\alpha^2} - 3\, H1^2\, t \sqrt{H1^2 + \alpha^2 t^2}\, \alpha \sqrt{\alpha^2} - 24\, t \sqrt{H1^2 + \alpha^2 t^2}\, H0\, T\, \alpha^2 \sqrt{\alpha^2}$$

$$+3\, H1^4\, \%2\, \alpha - 24\, H1^2\, \%2\, T^2 \alpha^3 - 16\, t^2 \sqrt{H1^2 + \alpha^2 t^2}\, T\, \alpha^3 \sqrt{\alpha^2} + 24\, H1^2\, \%2\, H0\, T\, \alpha^2$$

$$-8\, t^2 \sqrt{H1^2 + \alpha^2 t^2}\, H0\, \alpha^2 \sqrt{\alpha^2} - 48 \sqrt{H1^2 + \alpha^2 t^2}\, H0\, T^2 \alpha^2 \sqrt{\alpha^2}$$

$$-16\, H1^2 \sqrt{H1^2 + \alpha^2 t^2}\, T\, \alpha \sqrt{\alpha^2} + 16\, H1^2 \sqrt{H1^2 + \alpha^2 t^2}\, H0 \sqrt{\alpha^2}\,) \Big/ (T^2 \alpha^3 \sqrt{\alpha^2}) + \frac{1}{48} ($$

$$6\, t2^3 \sqrt{H1^2 + \alpha^2 t2^2}\, \alpha^3 \sqrt{\alpha^2} + 24\, t2 \sqrt{H1^2 + \alpha^2 t2^2}\, T^2 \alpha^3 \sqrt{\alpha^2} + 3\, H1^2\, t2 \sqrt{H1^2 + \alpha^2 t2^2}\, \alpha \sqrt{\alpha^2}$$

$$+24\, t2 \sqrt{H1^2 + \alpha^2 t2^2}\, H0\, T\, \alpha^2 \sqrt{\alpha^2} + 3\, H1^4\, \%1\, \alpha - 24\, H1^2\, \%1\, T^2 \alpha^3$$

$$-16\, t2^2 \sqrt{H1^2 + \alpha^2 t2^2}\, T\, \alpha^3 \sqrt{\alpha^2} + 24\, H1^2\, \%1\, H0\, T\, \alpha^2 - 8\, t2^2 \sqrt{H1^2 + \alpha^2 t2^2}\, H0\, \alpha^2 \sqrt{\alpha^2}$$

$$-48 \sqrt{H1^2 + \alpha^2 t2^2}\, H0\, T^2 \alpha^2 \sqrt{\alpha^2} - 16\, H1^2 \sqrt{H1^2 + \alpha^2 t2^2}\, T\, \alpha \sqrt{\alpha^2}$$

$$+16\, H1^2 \sqrt{H1^2 + \alpha^2 t2^2}\, H0 \sqrt{\alpha^2}\,) \Big/ (T^2 \alpha^3 \sqrt{\alpha^2}) \Big) / T \Big) \Big/ \sqrt{H1^2 + H^2 - 2\, H\, H0 + H0^2}$$

$$\%1 := \ln(-\sqrt{\alpha^2}\, t2 + \sqrt{H1^2 + \alpha^2 t2^2})$$

$$\%2 := \ln(\sqrt{\alpha^2}\, t + \sqrt{H1^2 + \alpha^2 t^2})$$

```
> eve2 :=subs(bcons1,odi2);
```

$$eve2 := .34700\ 10^{-8}\, H1\, \mathbf{e}^{\left(-\frac{.83333\, H - .83333\, H0 + 4.5}{T}\right)} \left(\frac{-5.40\, H0 + 29.160 + H1^2}{\sqrt{H1^2 + 29.160}} + \mathbf{e}^{\left(\frac{4.5}{T}\right)} \left(251.17 \left(.00095552\, T^5 + .0047776\, T^6 + .0016589\, \mathrm{Ei}\left(1, \frac{.2}{T}\right) H1^2\, \mathbf{e}^{\left(\frac{.2}{T}\right)} T^4 - .0036000\, H1^4\, T^4 + .00072000\, H1^4\, T^3 - .00014400\, H1^4\, \mathrm{Ei}\left(1, \frac{.2}{T}\right) \mathbf{e}^{\left(\frac{.2}{T}\right)} T^2 - .0039813\, T^5\, H0 + .0069120\, H0\, H1^2\, T^4 - .0013824\, H0\, H1^2\, \mathrm{Ei}\left(1, \frac{.2}{T}\right) \mathbf{e}^{\left(\frac{.2}{T}\right)} T^3 - .030000\, H0\, H1^4\, T^4 + .0030000\, H0\, H1^4\, T^3 - .00060000\, H0\, H1^4\, T^2 + .00012000\, H0\, H1^4\, \mathrm{Ei}\left(1, \frac{.2}{T}\right) \mathbf{e}^{\left(\frac{.2}{T}\right)} T + \frac{3}{32} H1^6\, T^4 - .0062500\, H1^6\, T^3 + .00062500\, H1^6\, T^2 - .00012500\, H1^6\, T + .000025000\, H1^6\, \mathrm{Ei}\left(1, \frac{.2}{T}\right) \mathbf{e}^{\left(\frac{.2}{T}\right)} \right) \mathbf{e}^{\left(-\frac{.2}{T}\right)} \Big/ T^4 + .00098000 \left(-5510.1\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} T^5 - 1224.4\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} T^6 - 425.15\, \mathrm{Ei}\left(1, \frac{4.5}{T}\right) H1^2\, T^4 + 1.8225\, H1^4\, T^4\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} - 8.2012\, H1^4\, T^3\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 36.906\, H1^4\, T^2\, \mathrm{Ei}\left(1, \frac{4.5}{T}\right) + 1020.4\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} H0\, T^5 - 78.733\, H0\, H1^2\, T^4\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 354.29\, H0\, H1^2\, T^3\, \mathrm{Ei}\left(1, \frac{4.5}{T}\right) + .67500\, H0\, H1^4\, T^4\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} - 1.5187\, H0\, H1^4\, T^3\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 6.8344\, H0\, H1^4\, T^2\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} - 30.755\, H0\, H1^4\, T\, \mathrm{Ei}\left(1, \frac{4.5}{T}\right) - \frac{3}{32} H1^6\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} T^4 + .14063\, H1^6\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} T^3 - .31641\, H1^6\, T^2\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 1.4238\, H1^6\, \mathbf{e}^{\left(-\frac{4.5}{T}\right)} T - 6.4072\, H1^6\, \mathrm{Ei}\left(1, \frac{4.5}{T}\right) \right) \Big/ T^4 \right) / T + \mathbf{e}^{\left(\frac{4.5}{T}\right)} (- .010047\, (-7.2000\, (H - H0)^3 \sqrt{H1^2 + (H - H0)^2} - 41.472\, (H - H0) \sqrt{H1^2 + (H - H0)^2}\, T^2 - 3.6000\, H1^2\, (H - H0) \sqrt{H1^2 + (H - H0)^2} - 34.560\, (H - H0) \sqrt{H1^2 + (H - H0)^2}\, H0\, T$$

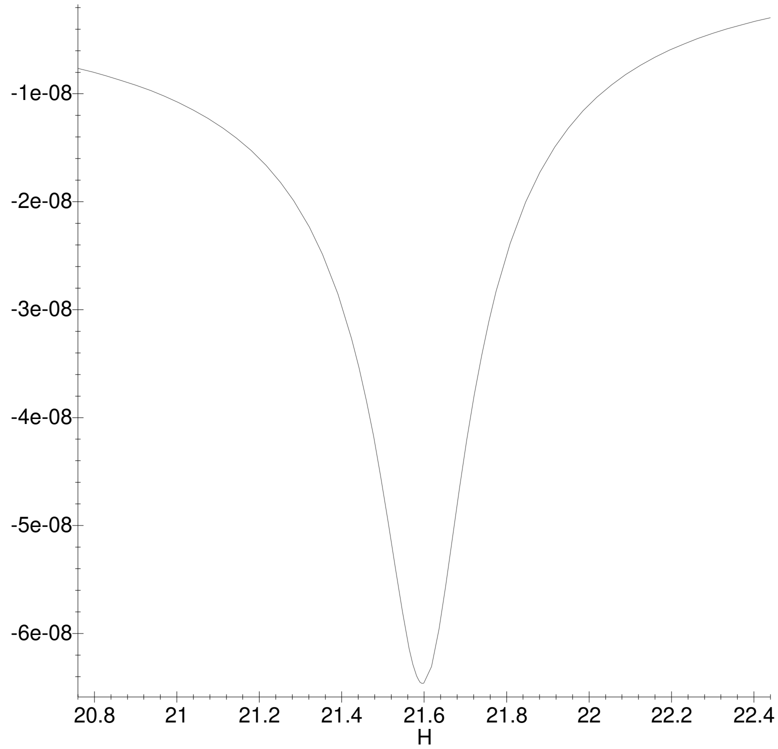
$$+ 3.6\, H1^4\, \%1 - 41.472\, H1^2\, \%1\, T^2 - 23.040\, (H - H0)^2 \sqrt{H1^2 + (H - H0)^2}\; T$$
$$+ 34.56\, H1^2\, \%1\, H0\, T - 9.6000\, (H - H0)^2 \sqrt{H1^2 + (H - H0)^2}\; H0$$
$$- 82.944 \sqrt{H1^2 + (H - H0)^2}\; H0\, T^2 - 23.040\, H1^2 \sqrt{H1^2 + (H - H0)^2}\; T$$
$$+ 19.200\, H1^2 \sqrt{H1^2 + (H - H0)^2}\; H0) \Big/ T^2 + .010047\, (.099533 \sqrt{H1^2 + .0576}$$
$$+ 9.9533 \sqrt{H1^2 + .0576}\; T^2 + .86400\, H1^2 \sqrt{H1^2 + .0576} + 8.2944 \sqrt{H1^2 + .0576}\; H0\, T$$
$$+ 3.6\, H1^4 \ln(-.24000 + \sqrt{H1^2 + .0576}\,) - 41.472\, H1^2 \ln(-.24000 + \sqrt{H1^2 + .0576}\,)\, T^2$$
$$- 1.3271 \sqrt{H1^2 + .0576}\; T + 34.56\, H1^2 \ln(-.24000 + \sqrt{H1^2 + .0576}\,)\, H0\, T$$
$$- .55296 \sqrt{H1^2 + .0576}\; H0 - 82.944 \sqrt{H1^2 + .0576}\; H0\, T^2 - 23.040\, H1^2 \sqrt{H1^2 + .0576}\; T$$
$$\left. + 19.200\, H1^2 \sqrt{H1^2 + .0576}\; H0) \Big/ T^2) \,/\, T \right) \Big/ \sqrt{H1^2 + H^2 - 2\, H\, H0 + H0^2}$$

$$\%1 := \ln(\, 1.0000\, H - 1.0000\, H0 + \sqrt{H1^2 + (H - H0)^2}\,)$$

```
> mil2 :=eval(subs(bcons12,eve2));
```

$$mil2 := .34700\; 10^{-9}\; \mathbf{e}^{(-.41667\, H + 6.7500)}\, (-185.54 + .085795\, (H - 21.60)^3 \sqrt{.01 + (H - 21.60)^2}$$
$$+ 19.767\, (H - 21.60) \sqrt{.01 + (H - 21.60)^2}$$
$$- .15813 \ln(\, 1.0000\, H - 21.600 + \sqrt{.01 + (H - 21.60)^2}\,)$$
$$+ 3.0199\, (H - 21.60)^2 \sqrt{.01 + (H - 21.60)^2} + 85.345 \sqrt{.01 + (H - 21.60)^2}\,) \Big/$$
$$\sqrt{466.57 + H^2 - 43.20\, H}$$

```
> plot(mil2, H=20.76..22.44);
```




```
> odi3
  :=H1/(sqrt(H1^2+(H-H0)^2))*exp(-(t-t0)/T)*xi*(((H0+alpha*t0)*(alph
  a*t0)+H1^2)/sqrt(H1^2+alpha^2*t0^2)+(1/T)*exp(-t0/T)*int(exp(t1/T)
  *(alpha^2*t1^2+alpha*H0*t1+H1^2)*(-1/(alpha*t1))*(1-H1^2/(2*alpha^
  2*t1^2)+3*H1^4/(8*alpha^4*t1^4)),t1=t0..-t2)+(1/T)*exp(-t0/T)*int(
  (1+t1/T+t1^2/(2*T^2))*(alpha^2*t1^2+alpha*H0*t1+H1^2)/sqrt(H1^2+al
  pha^2*t1^2),t1=-t2..t2)+(1/T)*exp(-t0/T)*int(exp(t1/T)*(alpha^2*t1
  ^2+alpha*H0*t1+H1^2)*(1/(alpha*t1))*(1-H1^2/(2*alpha^2*t1^2)+3*H1^
  4/(8*alpha^4*t1^4)),t1=t2..t));
```

$$odi3 := H1\, \mathbf{e}^{\left(-\frac{t-t0}{T}\right)} \xi \left(\frac{(H0 + \alpha\, t0)\, \alpha\, t0 + H1^2}{\sqrt{H1^2 + \alpha^2\, t0^2}} + \mathbf{e}^{\left(-\frac{t0}{T}\right)} \Bigg(\Bigg(\Bigg(t2^5\, \alpha^6\, T^5 + \alpha^6\, T^6\, t2^4 \right.$$

$$+ \frac{1}{2} \mathrm{Ei}\left(1, \frac{t2}{T}\right) H1^2\, \mathbf{e}^{\left(\frac{t2}{T}\right)} \alpha^4\, t2^4\, T^4 - \frac{1}{16} H1^4\, \alpha^2\, t2^2\, T^4 + \frac{1}{16} H1^4\, \alpha^2\, t2^3\, T^3$$

$$- \frac{1}{16} H1^4\, \mathrm{Ei}\left(1, \frac{t2}{T}\right) \mathbf{e}^{\left(\frac{t2}{T}\right)} \alpha^2\, t2^4\, T^2 - T^5\, H0\, \alpha^5\, t2^4 + \frac{1}{2} H0\, H1^2\, \alpha^3\, t2^3\, T^4$$

$$- \frac{1}{2} H0\, H1^2\, \mathrm{Ei}\left(1, \frac{t2}{T}\right) \mathbf{e}^{\left(\frac{t2}{T}\right)} \alpha^3\, t2^4\, T^3 - \frac{1}{8} H0\, H1^4\, \alpha\, t2\, T^4 + \frac{1}{16} H0\, H1^4\, \alpha\, t2^2\, T^3$$

$$-\frac{1}{16} H0\, H1^4\, \alpha\, t2^3\, T^2 + \frac{1}{16} H0\, H1^4\, \mathrm{Ei}\left(1, \frac{t2}{T}\right) \mathbf{e}^{\left(\frac{t2}{T}\right)} \alpha\, t2^4\, T + \frac{3}{32} H1^6\, T^4 - \frac{1}{32} H1^6\, t2\, T^3$$

$$+ \frac{1}{64} H1^6\, t2^2\, T^2 - \frac{1}{64} H1^6\, t2^3\, T + \frac{1}{64} H1^6\, \mathrm{Ei}\left(1, \frac{t2}{T}\right) \mathbf{e}^{\left(\frac{t2}{T}\right)} t2^4 \Bigg) \mathbf{e}^{\left(-\frac{t2}{T}\right)} \Big/ (\alpha^5\, t2^4\, T^4) + \Bigg($$

$$\mathbf{e}^{\left(\frac{t0}{T}\right)} \alpha^6\, T^5\, t0^5 - \mathbf{e}^{\left(\frac{t0}{T}\right)} \alpha^6\, T^6\, t0^4 - \frac{1}{2} \mathrm{Ei}\left(1, -\frac{t0}{T}\right) H1^2\, t0^4\, \alpha^4\, T^4 + \frac{1}{16} H1^4\, t0^2\, \alpha^2\, T^4\, \mathbf{e}^{\left(\frac{t0}{T}\right)}$$

$$+ \frac{1}{16} H1^4\, t0^3\, \alpha^2\, T^3\, \mathbf{e}^{\left(\frac{t0}{T}\right)} + \frac{1}{16} H1^4\, t0^4\, \alpha^2\, T^2\, \mathrm{Ei}\left(1, -\frac{t0}{T}\right) + \mathbf{e}^{\left(\frac{t0}{T}\right)} \alpha^5\, H0\, T^5\, t0^4$$

$$+ \frac{1}{2} H0\, H1^2\, t0^3\, \alpha^3\, T^4\, \mathbf{e}^{\left(\frac{t0}{T}\right)} + \frac{1}{2} H0\, H1^2\, t0^4\, \alpha^3\, T^3\, \mathrm{Ei}\left(1, -\frac{t0}{T}\right) - \frac{1}{8} H0\, H1^4\, t0\, \alpha\, T^4\, \mathbf{e}^{\left(\frac{t0}{T}\right)}$$

$$- \frac{1}{16} H0\, H1^4\, t0^2\, \alpha\, T^3\, \mathbf{e}^{\left(\frac{t0}{T}\right)} - \frac{1}{16} H0\, H1^4\, t0^3\, \alpha\, T^2\, \mathbf{e}^{\left(\frac{t0}{T}\right)} - \frac{1}{16} H0\, H1^4\, t0^4\, \alpha\, T\, \mathrm{Ei}\left(1, -\frac{t0}{T}\right)$$

$$- \frac{3}{32} H1^6\, \mathbf{e}^{\left(\frac{t0}{T}\right)} T^4 - \frac{1}{32} H1^6\, \mathbf{e}^{\left(\frac{t0}{T}\right)} T^3\, t0 - \frac{1}{64} H1^6\, T^2\, \mathbf{e}^{\left(\frac{t0}{T}\right)} t0^2 - \frac{1}{64} H1^6\, \mathbf{e}^{\left(\frac{t0}{T}\right)} T\, t0^3$$

$$- \frac{1}{64} H1^6\, \mathrm{Ei}\left(1, -\frac{t0}{T}\right) t0^4 \Bigg) \Big/ (t0^4\, \alpha^5\, T^4) \Bigg) / T + \mathbf{e}^{\left(-\frac{t0}{T}\right)} \Bigg(-\frac{1}{48} (-6\, t2^3 \sqrt{H1^2 + \alpha^2\, t2^2}\, \alpha^3 \sqrt{\alpha^2}$$

$$- 24\, t2 \sqrt{H1^2 + \alpha^2\, t2^2}\, T^2\, \alpha^3 \sqrt{\alpha^2} - 3\, H1^2\, t2 \sqrt{H1^2 + \alpha^2\, t2^2}\, \alpha \sqrt{\alpha^2}$$

$$- 24\, t2 \sqrt{H1^2 + \alpha^2\, t2^2}\, H0\, T\, \alpha^2 \sqrt{\alpha^2} + 3\, H1^4 \ln(\sqrt{\alpha^2}\, t2 + \%1)\, \alpha$$

$$- 24\, H1^2 \ln(\sqrt{\alpha^2}\, t2 + \%1)\, T^2\, \alpha^3 - 16\, t2^2 \sqrt{H1^2 + \alpha^2\, t2^2}\, T\, \alpha^3 \sqrt{\alpha^2}$$

$$+ 24\, H1^2 \ln(\sqrt{\alpha^2}\, t2 + \%1)\, H0\, T\, \alpha^2 - 8\, t2^2 \sqrt{H1^2 + \alpha^2\, t2^2}\, H0\, \alpha^2 \sqrt{\alpha^2}$$

$$- 48 \sqrt{H1^2 + \alpha^2\, t2^2}\, H0\, T^2\, \alpha^2 \sqrt{\alpha^2} - 16\, H1^2 \sqrt{H1^2 + \alpha^2\, t2^2}\, T\, \alpha \sqrt{\alpha^2}$$

$$+ 16\, H1^2 \sqrt{H1^2 + \alpha^2\, t2^2}\, H0 \sqrt{\alpha^2}\,) \Big/ (T^2\, \alpha^3 \sqrt{\alpha^2}\,) + \frac{1}{48} (6\, t2^3 \sqrt{H1^2 + \alpha^2\, t2^2}\, \alpha^3 \sqrt{\alpha^2}$$

$$+ 24\, t2 \sqrt{H1^2 + \alpha^2\, t2^2}\, T^2\, \alpha^3 \sqrt{\alpha^2} + 3\, H1^2\, t2 \sqrt{H1^2 + \alpha^2\, t2^2}\, \alpha \sqrt{\alpha^2}$$

$$+ 24\, t2 \sqrt{H1^2 + \alpha^2\, t2^2}\, H0\, T\, \alpha^2 \sqrt{\alpha^2} + 3\, H1^4 \ln(-\sqrt{\alpha^2}\, t2 + \%1)\, \alpha$$

$$- 24\, H1^2 \ln(-\sqrt{\alpha^2}\, t2 + \%1)\, T^2\, \alpha^3 - 16\, t2^2 \sqrt{H1^2 + \alpha^2\, t2^2}\, T\, \alpha^3 \sqrt{\alpha^2}$$

$$+ 24\, H1^2 \ln(-\sqrt{\alpha^2}\, t2 + \%1)\, H0\, T\, \alpha^2 - 8\, t2^2 \sqrt{H1^2 + \alpha^2\, t2^2}\, H0\, \alpha^2 \sqrt{\alpha^2}$$

$$- 48 \sqrt{H1^2 + \alpha^2\, t2^2}\, H0\, T^2\, \alpha^2 \sqrt{\alpha^2} - 16\, H1^2 \sqrt{H1^2 + \alpha^2\, t2^2}\, T\, \alpha \sqrt{\alpha^2}$$

$$+16\,H1^2\sqrt{H1^2+\alpha^2\,t2^2}\;H0\sqrt{\alpha^2}\,)\Big/(T^2\,\alpha^3\sqrt{\alpha^2}\,)\Bigg)\Big/T+\mathbf{e}^{\left(-\frac{t0}{T}\right)}\Bigg(\Bigg(\Bigg(\mathbf{e}^{\left(\frac{t}{T}\right)}\alpha^6\,T^5\,t^5-\mathbf{e}^{\left(\frac{t}{T}\right)}\alpha^6\,T^6\,t^4$$

$$-\frac{1}{2}\,\mathrm{Ei}\left(1,-\frac{t}{T}\right)H1^2\,t^4\,\alpha^4\,T^4+\frac{1}{16}\,H1^4\,t^2\,\alpha^2\,T^4\,\mathbf{e}^{\left(\frac{t}{T}\right)}+\frac{1}{16}\,H1^4\,t^3\,\alpha^2\,T^3\,\mathbf{e}^{\left(\frac{t}{T}\right)}$$

$$+\frac{1}{16}\,H1^4\,t^4\,\alpha^2\,T^2\,\mathrm{Ei}\left(1,-\frac{t}{T}\right)+\mathbf{e}^{\left(\frac{t}{T}\right)}\alpha^5\,H0\,T^5\,t^4+\frac{1}{2}\,H0\,H1^2\,t^3\,\alpha^3\,T^4\,\mathbf{e}^{\left(\frac{t}{T}\right)}$$

$$+\frac{1}{2}\,H0\,H1^2\,t^4\,\alpha^3\,T^3\,\mathrm{Ei}\left(1,-\frac{t}{T}\right)-\frac{1}{8}\,H0\,H1^4\,t\,\alpha\,T^4\,\mathbf{e}^{\left(\frac{t}{T}\right)}-\frac{1}{16}\,H0\,H1^4\,t^2\,\alpha\,T^3\,\mathbf{e}^{\left(\frac{t}{T}\right)}$$

$$-\frac{1}{16}\,H0\,H1^4\,t^3\,\alpha\,T^2\,\mathbf{e}^{\left(\frac{t}{T}\right)}-\frac{1}{16}\,H0\,H1^4\,t^4\,\alpha\,T\,\mathrm{Ei}\left(1,-\frac{t}{T}\right)-\frac{3}{32}\,H1^6\,\mathbf{e}^{\left(\frac{t}{T}\right)}T^4-\frac{1}{32}\,H1^6\,\mathbf{e}^{\left(\frac{t}{T}\right)}T^3\,t$$

$$-\frac{1}{64}\,H1^6\,T^2\,\mathbf{e}^{\left(\frac{t}{T}\right)}t^2-\frac{1}{64}\,H1^6\,\mathbf{e}^{\left(\frac{t}{T}\right)}T\,t^3-\frac{1}{64}\,H1^6\,\mathrm{Ei}\left(1,-\frac{t}{T}\right)t^4\Bigg)\Big/(t^4\,\alpha^5\,T^4)+\Bigg(-\mathbf{e}^{\left(\frac{t2}{T}\right)}\alpha^6\,T^5\,t2^5$$

$$+\mathbf{e}^{\left(\frac{t2}{T}\right)}\alpha^6\,T^6\,t2^4+\frac{1}{2}\,\mathrm{Ei}\left(1,-\frac{t2}{T}\right)H1^2\,t2^4\,\alpha^4\,T^4-\frac{1}{16}\,H1^4\,t2^2\,\alpha^2\,T^4\,\mathbf{e}^{\left(\frac{t2}{T}\right)}-\frac{1}{16}\,H1^4\,t2^3\,\alpha^2\,T^3\,\mathbf{e}^{\left(\frac{t2}{T}\right)}$$

$$-\frac{1}{16}\,H1^4\,t2^4\,\alpha^2\,T^2\,\mathrm{Ei}\left(1,-\frac{t2}{T}\right)-\mathbf{e}^{\left(\frac{t2}{T}\right)}\alpha^5\,H0\,T^5\,t2^4-\frac{1}{2}\,H0\,H1^2\,t2^3\,\alpha^3\,T^4\,\mathbf{e}^{\left(\frac{t2}{T}\right)}$$

$$-\frac{1}{2}\,H0\,H1^2\,t2^4\,\alpha^3\,T^3\,\mathrm{Ei}\left(1,-\frac{t2}{T}\right)+\frac{1}{8}\,H0\,H1^4\,t2\,\alpha\,T^4\,\mathbf{e}^{\left(\frac{t2}{T}\right)}+\frac{1}{16}\,H0\,H1^4\,t2^2\,\alpha\,T^3\,\mathbf{e}^{\left(\frac{t2}{T}\right)}$$

$$+\frac{1}{16}\,H0\,H1^4\,t2^3\,\alpha\,T^2\,\mathbf{e}^{\left(\frac{t2}{T}\right)}+\frac{1}{16}\,H0\,H1^4\,t2^4\,\alpha\,T\,\mathrm{Ei}\left(1,-\frac{t2}{T}\right)+\frac{3}{32}\,H1^6\,\mathbf{e}^{\left(\frac{t2}{T}\right)}T^4+\frac{1}{32}\,H1^6\,\mathbf{e}^{\left(\frac{t2}{T}\right)}T^3\,t2$$

$$+\frac{1}{64}\,H1^6\,T^2\,\mathbf{e}^{\left(\frac{t2}{T}\right)}t2^2+\frac{1}{64}\,H1^6\,\mathbf{e}^{\left(\frac{t2}{T}\right)}T\,t2^3+\frac{1}{64}\,H1^6\,\mathrm{Ei}\left(1,-\frac{t2}{T}\right)t2^4\Bigg)\Big/(t2^4\,\alpha^5\,T^4)\Bigg)\Big/T\Bigg)\Big/$$

$$\sqrt{H1^2+H^2-2\,H\,H0+H0^2}$$

$$\%1:=\sqrt{H1^2+\alpha^2\,t2^2}$$

```
> eve3 :=subs(bcons1,odi3);
```

$$eve3:=.34700\;10^{-8}\,H1\,\mathbf{e}^{\left(-\frac{.83333\,H-.83333\,H0+4.5}{T}\right)}\left(\frac{-5.40\,H0+29.160+H1^2}{\sqrt{H1^2+29.160}}+\mathbf{e}^{\left(\frac{4.5}{T}\right)}\Bigg(251.17\Bigg(\right.$$

$$.00095552\,T^5 + .0047776\,T^6 + .0016589\,\mathrm{Ei}\left(1, \frac{.2}{T}\right) HI^2\,\mathbf{e}^{\left(\frac{.2}{T}\right)}\,T^4 - .0036000\,HI^4\,T^4$$

$$+ .00072000\,HI^4\,T^3 - .00014400\,HI^4\,\mathrm{Ei}\left(1, \frac{.2}{T}\right)\mathbf{e}^{\left(\frac{.2}{T}\right)}\,T^2 - .0039813\,T^5\,H0 + .0069120\,H0\,HI^2\,T^4$$

$$- .0013824\,H0\,HI^2\,\mathrm{Ei}\left(1, \frac{.2}{T}\right)\mathbf{e}^{\left(\frac{.2}{T}\right)}\,T^3 - .030000\,H0\,HI^4\,T^4 + .0030000\,H0\,HI^4\,T^3$$

$$- .00060000\,H0\,HI^4\,T^2 + .00012000\,H0\,HI^4\,\mathrm{Ei}\left(1, \frac{.2}{T}\right)\mathbf{e}^{\left(\frac{.2}{T}\right)}\,T + \frac{3}{32}\,HI^6\,T^4 - .0062500\,HI^6\,T^3$$

$$+ .00062500\,HI^6\,T^2 - .00012500\,HI^6\,T + .000025000\,HI^6\,\mathrm{Ei}\left(1, \frac{.2}{T}\right)\mathbf{e}^{\left(\frac{.2}{T}\right)}\Bigg)\mathbf{e}^{\left(-\frac{.2}{T}\right)} \Big/ T^4 +$$

$$.00098000\Bigg(-5510.1\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)}\,T^5 - 1224.4\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)}\,T^6 - 425.15\,\mathrm{Ei}\left(1, \frac{4.5}{T}\right) HI^2\,T^4$$

$$+ 1.8225\,HI^4\,T^4\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)} - 8.2012\,HI^4\,T^3\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 36.906\,HI^4\,T^2\,\mathrm{Ei}\left(1, \frac{4.5}{T}\right)$$

$$+ 1020.4\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)}\,H0\,T^5 - 78.733\,H0\,HI^2\,T^4\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 354.29\,H0\,HI^2\,T^3\,\mathrm{Ei}\left(1, \frac{4.5}{T}\right)$$

$$+ .67500\,H0\,HI^4\,T^4\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)} - 1.5187\,H0\,HI^4\,T^3\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 6.8344\,H0\,HI^4\,T^2\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)}$$

$$- 30.755\,H0\,HI^4\,T\,\mathrm{Ei}\left(1, \frac{4.5}{T}\right) - \frac{3}{32}\,HI^6\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)}\,T^4 + .14063\,HI^6\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)}\,T^3$$

$$- .31641\,HI^6\,T^2\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)} + 1.4238\,HI^6\,\mathbf{e}^{\left(-\frac{4.5}{T}\right)}\,T - 6.4072\,HI^6\,\mathrm{Ei}\left(1, \frac{4.5}{T}\right)\Bigg) \Big/ T^4\Bigg) / T + \mathbf{e}^{\left(\frac{4.5}{T}\right)}\,(-$$

$$.010047\,(-.099533\sqrt{HI^2 + .0576} - 9.9533\sqrt{HI^2 + .0576}\,T^2 - .86400\,HI^2\sqrt{HI^2 + .0576}$$
$$- 8.2944\sqrt{HI^2 + .0576}\,H0\,T + 3.6\,HI^4\ln(.24000 + \sqrt{HI^2 + .0576})$$
$$- 41.472\,HI^2\ln(.24000 + \sqrt{HI^2 + .0576})\,T^2 - 1.3271\sqrt{HI^2 + .0576}\,T$$
$$+ 34.56\,HI^2\ln(.24000 + \sqrt{HI^2 + .0576})\,H0\,T - .55296\sqrt{HI^2 + .0576}\,H0$$
$$- 82.944\sqrt{HI^2 + .0576}\,H0\,T^2 - 23.040\,HI^2\sqrt{HI^2 + .0576}\,T + 19.200\,HI^2\sqrt{HI^2 + .0576}\,H0)$$
$$\Big/ T^2 + .010047\,(.099533\sqrt{HI^2 + .0576} + 9.9533\sqrt{HI^2 + .0576}\,T^2 + .86400\,HI^2\sqrt{HI^2 + .0576}$$

$$
\begin{aligned}
&+ 8.2944 \sqrt{H1^2 + .0576}\ H0\, T + 3.6\, H1^4 \ln(-.24000 + \sqrt{H1^2 + .0576}) \\
&- 41.472\, H1^2 \ln(-.24000 + \sqrt{H1^2 + .0576})\, T^2 - 1.3271 \sqrt{H1^2 + .0576}\ T \\
&+ 34.56\, H1^2 \ln(-.24000 + \sqrt{H1^2 + .0576})\, H0\, T - .55296 \sqrt{H1^2 + .0576}\ H0 \\
&- 82.944 \sqrt{H1^2 + .0576}\ H0\, T^2 - 23.040\, H1^2 \sqrt{H1^2 + .0576}\ T + 19.200\, H1^2 \sqrt{H1^2 + .0576}\ H0) \\
&\Big/ T^2) / T + \mathbf{e}^{\left(\frac{4.5}{T}\right)} \Bigg(.83333 \Bigg(1.2\ \%2\ T^5 (H - H0)^5 - 1.44\ \%2\ T^6 (H - H0)^4 \\
&- \frac{1}{2}\ \%1\ H1^2 (H - H0)^4 T^4 + \frac{1}{16} H1^4 (H - H0)^2 T^4\ \%2 + .052083\, H1^4 (H - H0)^3 T^3\ \%2 \\
&+ .043403\, H1^4 (H - H0)^4 T^2\ \%1 + 1.2\ \%2\ H0\, T^5 (H - H0)^4 + \frac{1}{2} H0\, H1^2 (H - H0)^3 T^4\ \%2 \\
&+ .41667\, H0\, H1^2 (H - H0)^4 T^3\ \%1 - \frac{1}{8} H0\, H1^4 (H - H0)\, T^4\ \%2 \\
&- .052083\, H0\, H1^4 (H - H0)^2 T^3\ \%2 - .043403\, H0\, H1^4 (H - H0)^3 T^2\ \%2 \\
&- .036169\, H0\, H1^4 (H - H0)^4\, T\ \%1 - \frac{3}{32} H1^6\ \%2\ T^4 - .026042\, H1^6\ \%2\ T^3 (H - H0) \\
&- .010851\, H1^6\, T^2\ \%2\ (H - H0)^2 - .0090422\, H1^6\ \%2\ T (H - H0)^3 - .0075352\, H1^6\ \%1\ (H - H0)^4 \\
&\Bigg) \Big/ ((H - H0)^4 T^4) + 251.17 \Bigg(-.00095552\, \mathbf{e}^{\left(\frac{.2}{T}\right)} T^5 + .0047776\, \mathbf{e}^{\left(\frac{.2}{T}\right)} T^6 \\
&+ .0016589\, \mathrm{Ei}\left(1, -\frac{.2}{T}\right) H1^2 T^4 - .0036000\, H1^4 T^4\, \mathbf{e}^{\left(\frac{.2}{T}\right)} - .00072000\, H1^4 T^3\, \mathbf{e}^{\left(\frac{.2}{T}\right)} \\
&- .00014400\, H1^4 T^2\, \mathrm{Ei}\left(1, -\frac{.2}{T}\right) - .0039813\, \mathbf{e}^{\left(\frac{.2}{T}\right)} H0\, T^5 - .0069120\, H0\, H1^2 T^4\, \mathbf{e}^{\left(\frac{.2}{T}\right)} \\
&- .0013824\, H0\, H1^2 T^3\, \mathrm{Ei}\left(1, -\frac{.2}{T}\right) + .030000\, H0\, H1^4 T^4\, \mathbf{e}^{\left(\frac{.2}{T}\right)} + .0030000\, H0\, H1^4 T^3\, \mathbf{e}^{\left(\frac{.2}{T}\right)} \\
&+ .00060000\, H0\, H1^4 T^2\, \mathbf{e}^{\left(\frac{.2}{T}\right)} + .00012000\, H0\, H1^4\, T\, \mathrm{Ei}\left(1, -\frac{.2}{T}\right) + \frac{3}{32} H1^6\, \mathbf{e}^{\left(\frac{.2}{T}\right)} T^4 \\
&+ .0062500\, H1^6\, \mathbf{e}^{\left(\frac{.2}{T}\right)} T^3 + .00062500\, H1^6 T^2\, \mathbf{e}^{\left(\frac{.2}{T}\right)} + .00012500\, H1^6\, \mathbf{e}^{\left(\frac{.2}{T}\right)} T \\
&+ .000025000\, H1^6\, \mathrm{Ei}\left(1, -\frac{.2}{T}\right) \Bigg) \Big/ T^4 \Bigg) / T \Bigg) \Big/ \sqrt{H1^2 + H^2 - 2\, H\, H0 + H0^2}
\end{aligned}
$$

$$\%1 := \mathrm{Ei}\left(1, -.83333\,\frac{H - H0}{T}\right)$$

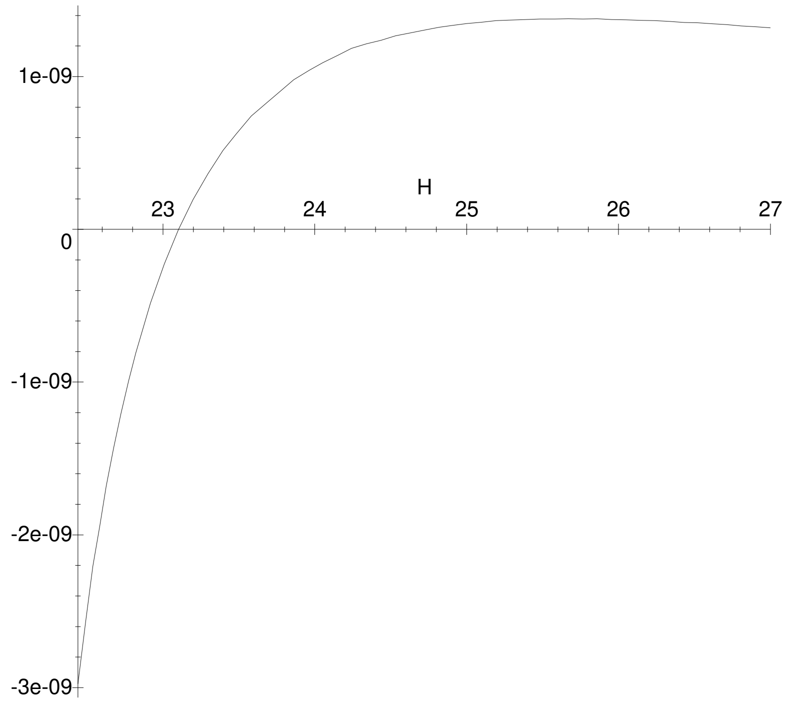
$$\%2 := \mathbf{e}^{\left(.83333\,\frac{H-H0}{T}\right)}$$

```
> mil3 :=Re(eval(subs(bcons12,eve3)));
```

$$mil3 := .34700\ 10^{-9}\ \Re(\mathbf{e}^{(-.41667\,H + 6.7500)}\,(-367.94 + .24708\,(38.4\ \%1\,(H - 21.60)^5 + 737.28\ \%1\,(H - 21.60)^4 + .63987\ \mathrm{Ei}(1, -.41667\,H + 9.0000)\,(H - 21.60)^4 - .00080004\,(H - 21.60)^2\ \%1 + 1.7277\,(H - 21.60)^3\ \%1 - .0043202\,(H - 21.60)\ \%1 - .15000\ 10^{-5}\ \%1)\ \Big/\ (H - 21.60)^4 + .49668\,I)\ \Big/\ \sqrt{466.57 + H^2 - 43.20\,H}\,)$$

$$\%1 := \mathbf{e}^{(.41667\,H - 9.0000)}$$

```
> plot(mil3, H=22.44..27.00,color=blue);
```



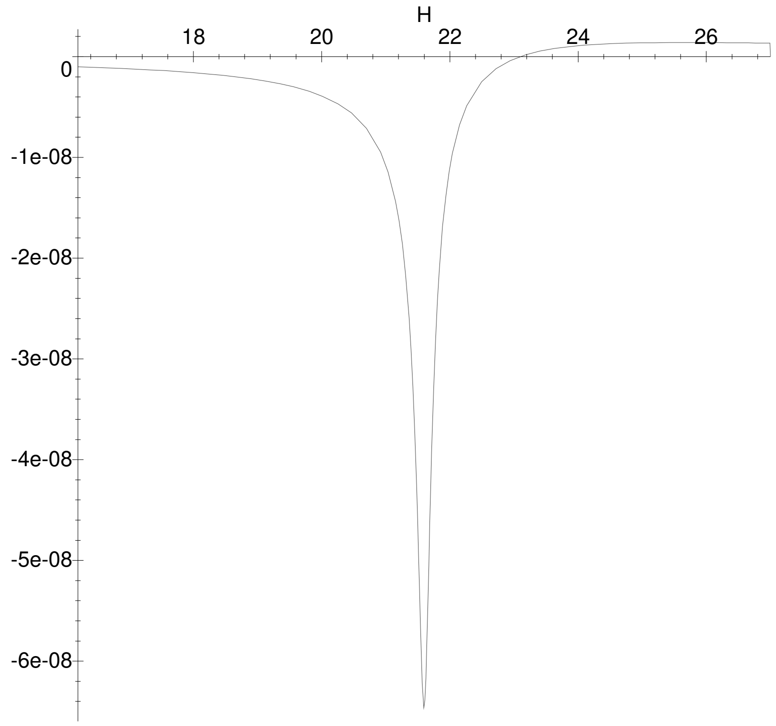

```
> f :=H->piecewise(H<20.76,mil1,H<22.44,mil2,H<27.00,mil3);
```

$$f := H \rightarrow \mathrm{piecewise}(H < 20.76,\ mil1,\ H < 22.44,\ mil2,\ H < 27.00,\ mil3)$$

In the above expression xi is a constant. We know t0, alpha, T1, H1 and H0. All these are our fitting parameters. Substituting all this parameters into the above formula we could be able to plot our analytical expression though not so wonderful. M(H; H0, H1, T1). Supposing V(H; H0, H1, T1, A,

B, C) = A M(H; H0, H1, T) + B H + C . The last two terms stand for the linear background.
For a better fit we could be able to regulate our fitting parameters A, B, C, H0, H1, T1. All these parameters can change according to the shape of the signal.

```
> plot(f(H),H=16.2..27.0);
```



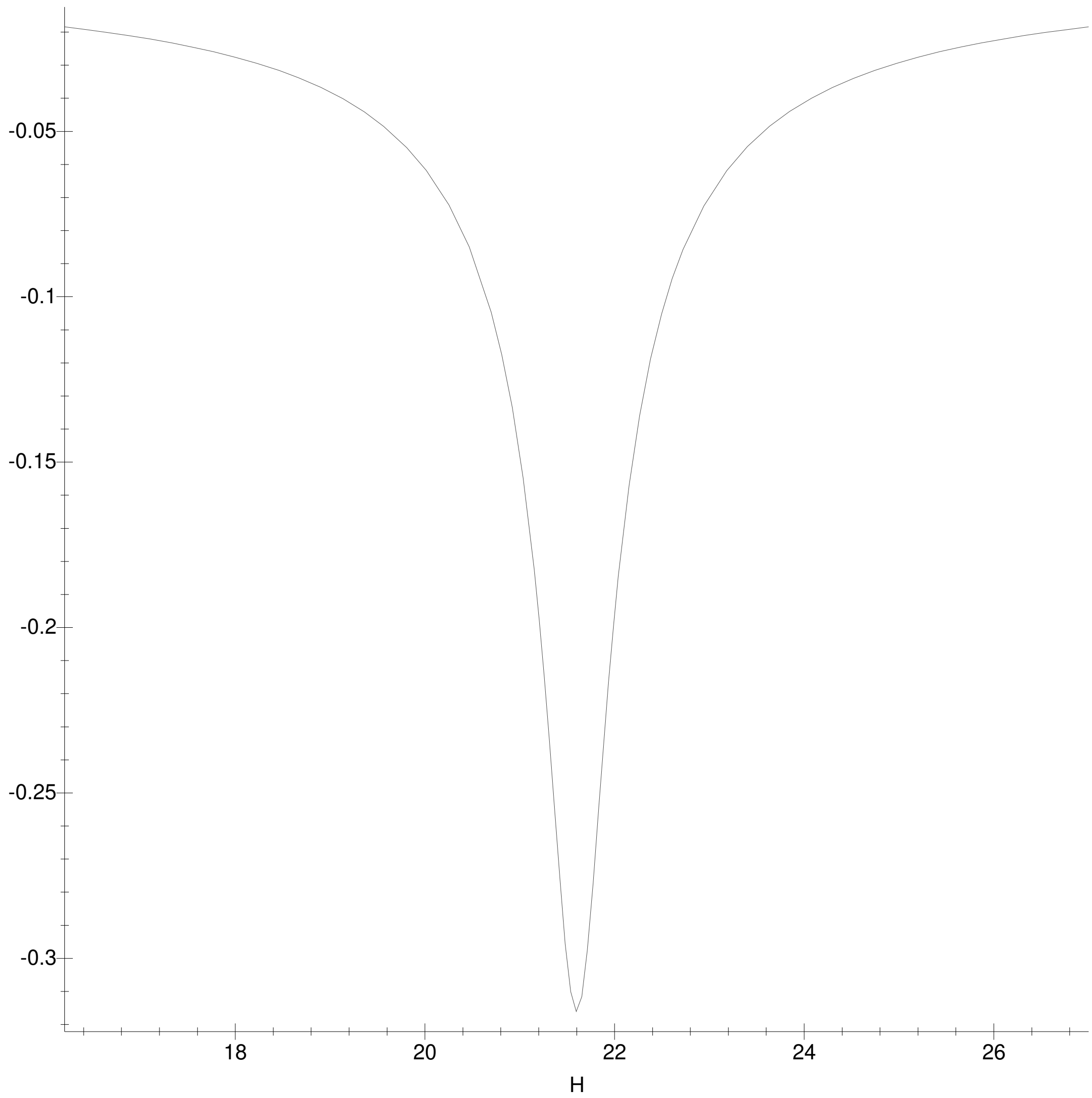

```
> try :=-H1/sqrt((H-H0)^2+H1);
```

$$try := -\frac{H1}{\sqrt{H^2 - 2\,H\,H0 + H0^2 + H1}}$$

```
> wow :=subs(bcons12,try);
```

$$wow := -\frac{.1}{\sqrt{H^2 - 43.20\,H + 466.66}}$$

```
> plot(wow,H=16.2..27.00);
```




```
> with(student);
Warning, new definition for D
```

[*D*, *Diff*, *Doubleint*, *Int*, *Limit*, *Lineint*, *Product*, *Sum*, *Tripleint*, *changevar*, *combine*, *completesquare*, *distance*, *equate*, *extrema*, *integrand*, *intercept*, *intparts*, *isolate*, *leftbox*, *leftsum*, *makeproc*, *maximize*, *middlebox*, *middlesum*, *midpoint*, *minimize*, *powsubs*, *rightbox*, *rightsum*, *showtangent*, *simpson*, *slope*, *trapezoid*, *value*]

```
> bcons :=H1=0.025, H0=21.6;
```

$$bcons := H1 = .025, H0 = 21.6$$

```
> dog :=evalf(solve(H*H1^2-(H0-H)^3=0,H));
```

$$dog := .16667\,\%1^{1/3} - 2.\,\frac{H1^2}{\%1^{1/3}} + H0,$$

$$-.083333\,\%1^{1/3} + \frac{H1^2}{\%1^{1/3}} + H0 + .86605\,I\left(.16667\,\%1^{1/3} + 2.\,\frac{H1^2}{\%1^{1/3}}\right),$$

$$-.083333\,\%1^{1/3} + \frac{H1^2}{\%1^{1/3}} + H0 - .86605\,I\left(.16667\,\%1^{1/3} + 2.\,\frac{H1^2}{\%1^{1/3}}\right)$$

$$\%1 := -108.\,H0\,H1^2 + 12.\,\sqrt{12.\,H1^6 + 81.\,H0^2\,H1^4}$$

```
> dog1
:=.1666666667*(-108.*H0*H1^2+12.*(12.*H1^6+81.*H0^2*H1^4)^(1/2))^(
1/3)-2.*H1^2/(-108.*H0*H1^2+12.*(12.*H1^6+81.*H0^2*H1^4)^(1/2))^(1
/3)+H0;
```

$$dog1 := .1666666667\,(-108.\,H0\,H1^2 + 12.\,\sqrt{12.\,H1^6 + 81.\,H0^2\,H1^4}\,)^{1/3} - 2.\,\frac{H1^2}{(-108.\,H0\,H1^2 + 12.\,\sqrt{12.\,H1^6 + 81.\,H0^2\,H1^4}\,)^{1/3}} + H0$$

```
> obo :=";
```

$$obo := .1666666667\,(-108.\,H0\,H1^2 + 12.\,\sqrt{12.\,H1^6 + 81.\,H0^2\,H1^4}\,)^{1/3} - 2.\,\frac{H1^2}{(-108.\,H0\,H1^2 + 12.\,\sqrt{12.\,H1^6 + 81.\,H0^2\,H1^4}\,)^{1/3}} + H0$$

```
> dog2
:=-.833e-1*(108.*H0*H1^2+12.*(-12.*H1^6+81.*H0^2*H1^4)^(1/2))^(1/3
)-1.*H1^2/(108.*H0*H1^2+12.*(-12.*H1^6+81.*H0^2*H1^4)^(1/2))^(1/3)
+H0+.865*I*(.167*(108.*H0*H1^2+12.*(-12.*H1^6+81.*H0^2*H1^4)^(1/2)
)^(1/3)-2.*H1^2/(108.*H0*H1^2+12.*(-12.*H1^6+81.*H0^2*H1^4)^(1/2))
^(1/3));
```

$$dog2 := -.0833\,\%1^{1/3} - 1.\,\frac{H1^2}{\%1^{1/3}} + H0 + .865\,I\left(.167\,\%1^{1/3} - 2.\,\frac{H1^2}{\%1^{1/3}}\right)$$

$$\%1 := 108.\,H0\,H1^2 + 12.\,\sqrt{-12.\,H1^6 + 81.\,H0^2\,H1^4}$$

```
> subs(bcons,dog2);
```

$$21.481 + .20563\,I$$

```
> dog3
:=-.833e-1*(108.*H0*H1^2+12.*(-12.*H1^6+81.*H0^2*H1^4)^(1/2))^(1/3
)-1.*H1^2/(108.*H0*H1^2+12.*(-12.*H1^6+81.*H0^2*H1^4)^(1/2))^(1/3)
+H0-.865*I*(.167*(108.*H0*H1^2+12.*(-12.*H1^6+81.*H0^2*H1^4)^(1/2)
)^(1/3)-2.*H1^2/(108.*H0*H1^2+12.*(-12.*H1^6+81.*H0^2*H1^4)^(1/2))
^(1/3));
```

$$dog3 := -.0833\ \%1^{1/3} - 1.\ \frac{H1^2}{\%1^{1/3}} + H0 - .865\ I\left(.167\ \%1^{1/3} - 2.\ \frac{H1^2}{\%1^{1/3}}\right)$$

$$\%1 := 108.\ H0\ H1^2 + 12.\ \sqrt{-12.\ H1^6 + 81.\ H0^2\ H1^4}$$

```
> subs(bcons,dog3);
```

$$21.481 - .20563\ I$$

```
> dog4 :=(H0^2-2*H*H0)/sqrt(H0*H);
```

$$dog4 := \frac{H0^2 - 2\ H\ H0}{\sqrt{H\ H0}}$$

```
> subs(bcons,dog4);
```

$$.21516\ \frac{466.56 - 43.2\ H}{\sqrt{H}}$$

```
> .2151657415*(466.56-43.2*21.36294296)/21.36294296^(1/2);
```

$$-21.243$$

```
>
>
```