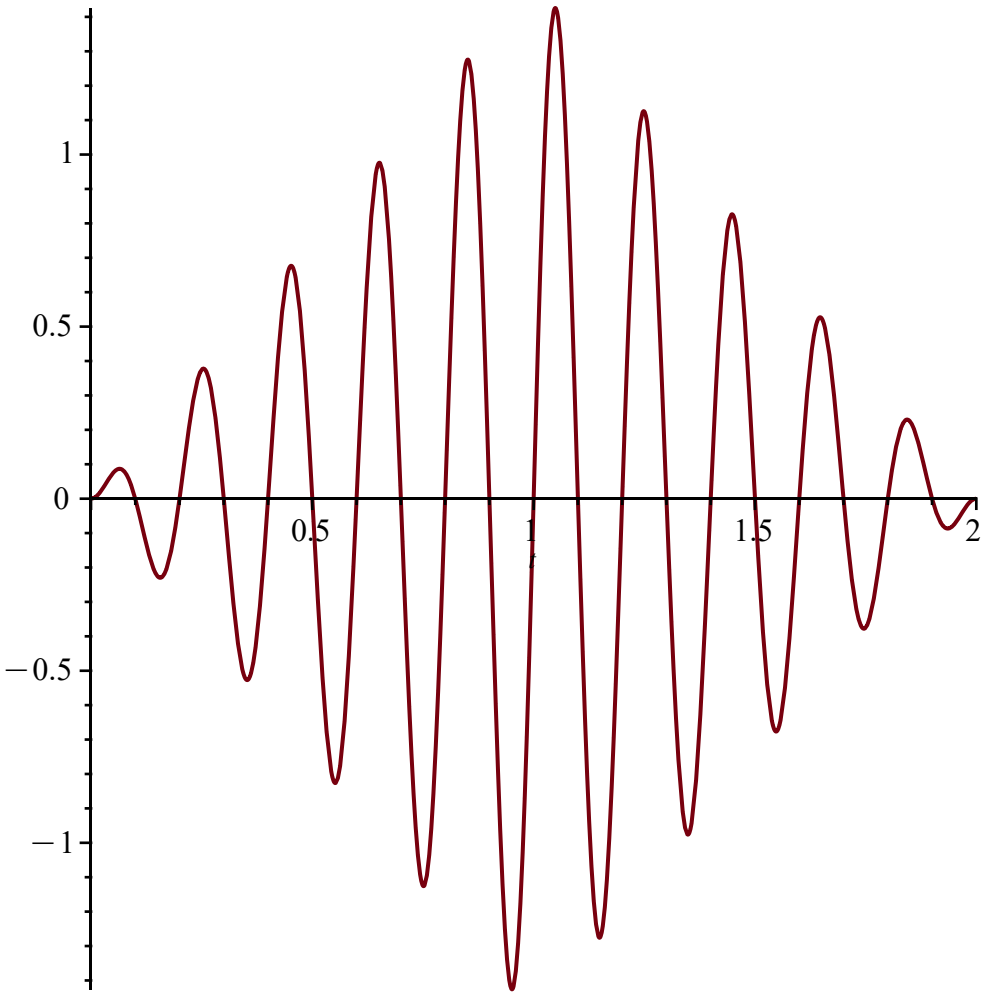
```
> with(Statistics):
> infolevel[Statistics] := 1
```

$$infolevel_{Statistics} := 1 \tag{1}$$

```
> with(DynamicSystems):
> y_a := t -> piecewise(0 <= t and t <= 1, Sine(1.5 * t, 10 * Pi, 0, 0), 1 <= t and t <= 2, Sine(1.5
      * (2 - t), 10 * Pi, 0, 0))
```

$$y\_a := t \mapsto \begin{cases} Sine(1.5 \cdot t, 10 \cdot \pi, 0, 0) & 0 \le t \le 1 \\ Sine(1.5 \cdot (2 - t), 10 \cdot \pi, 0, 0) & 1 \le t \le 2 \end{cases} \tag{2}$$

```
> plot(y_a(t), t = 0 .. 2)
```

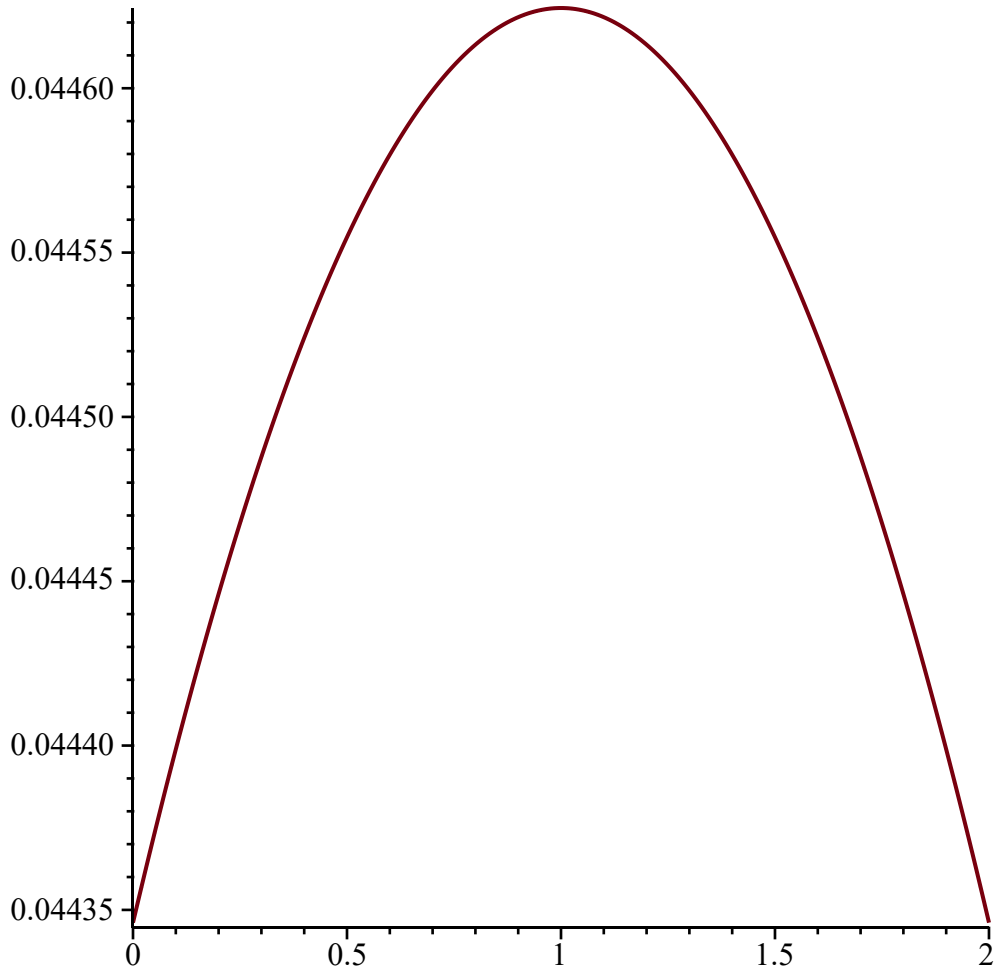



```
>
> with(stats):
> mu(t) := statevalf[pdf, normald[1, 2 * 4.47]];
```

(3)

$$\mu := t \mapsto statevalf_{pdf,\ normald}{}_{1,\ 8.94} \tag{3}$$

```
> plot(mu(t), 0..2)
```



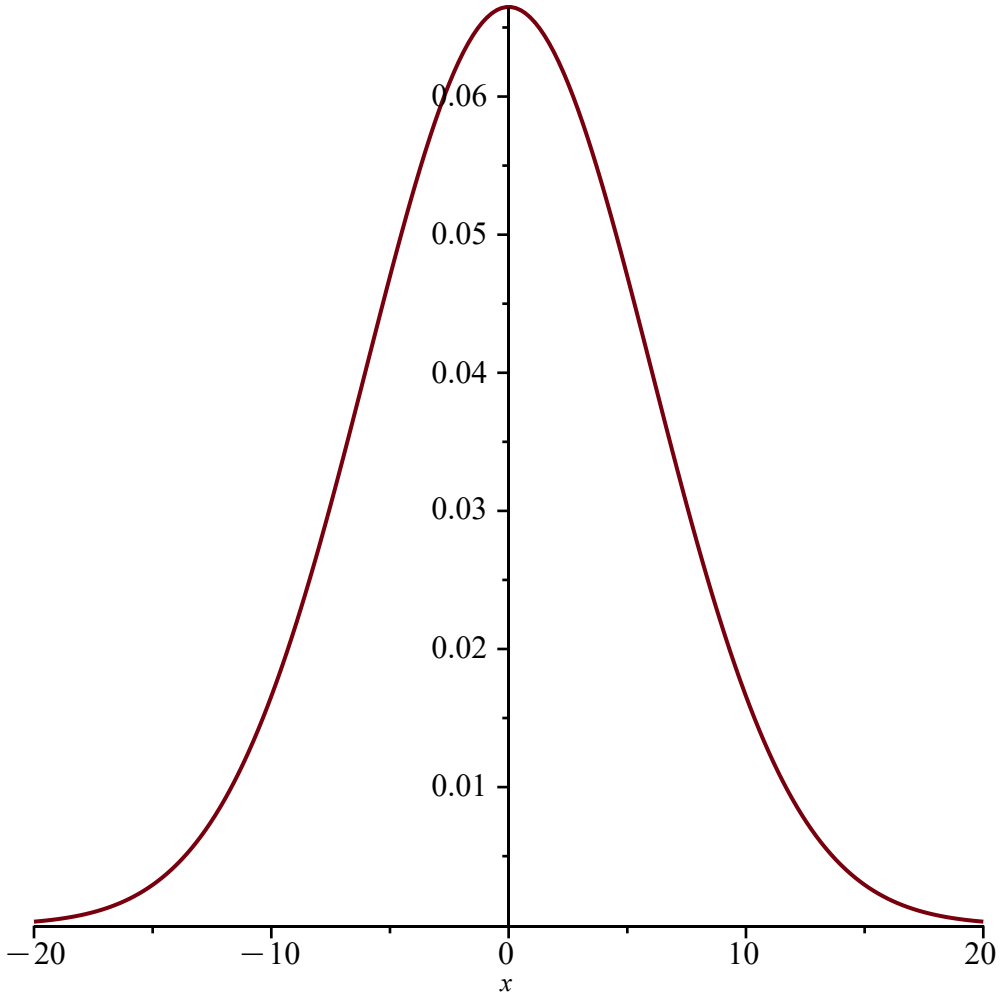

```
> y(t) = y_a(t) + mu(t)
```

$$y(t) = \left(\begin{cases} \begin{cases} 0 & t < 0 \\ 1.5\, t \sin(10\,\pi\, t) & otherwise \end{cases} & 0 \le t \le 1 \\ \begin{cases} 0 & t < 0 \\ (3.0 - 1.5\, t) \sin(10\,\pi\, t) & otherwise \end{cases} & 1 \le t \le 2 \end{cases} \right) + statevalf_{pdf,\ normald}{}_{1,\ 8.94} \tag{4}$$

```
> plot( (y_a(t) + mu(t)), 0..2)
Error, (in plot) procedure expected, as range contains no plotting variable
> with(Statistics) :
> prob := PDF(RandomVariable(NormalDistribution(0, 6)), x)
```

$$prob := \frac{\sqrt{2}\, e^{-\frac{x^2}{72}}}{12\sqrt{\pi}} \tag{5}$$

> $plot(prob, x = -20 .. 20)$



> $int(x * prob, x)$

$$-\frac{3\sqrt{2}\,e^{-\frac{x^2}{72}}}{\sqrt{\pi}} \tag{6}$$

>

> $\hat{y}(t) = int(x * prob, x)$

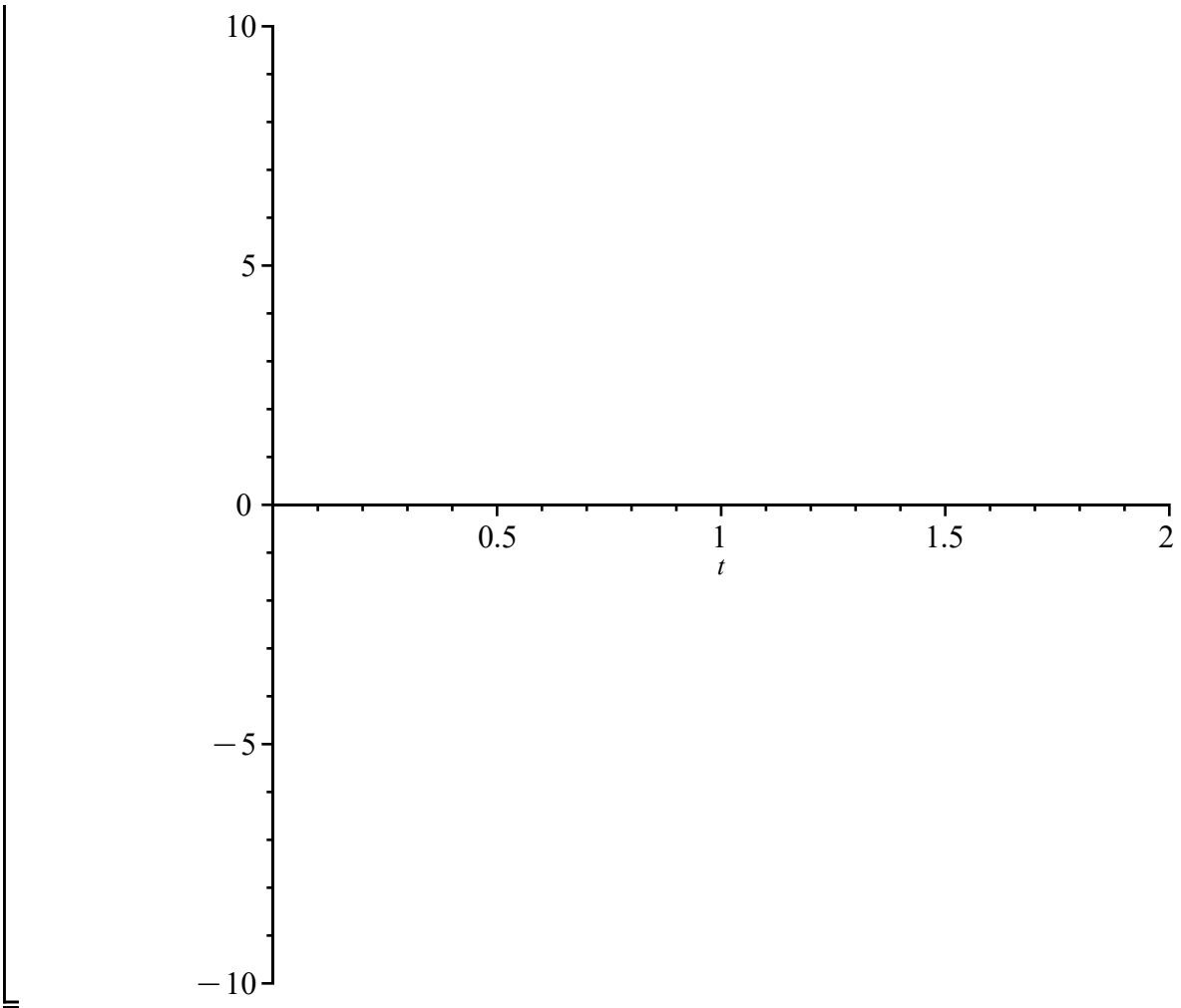
$$\hat{y}(t) = -\frac{3\sqrt{2}\,e^{-\frac{x^2}{72}}}{\sqrt{\pi}} \tag{7}$$

> $v(t) := y(t) - `#mover(mi("y"),mo("^"))`(t)$

$$v := t \mapsto y(t) - \hat{y}(t) \tag{8}$$

> $plot(v(t), t = 0 .. 2)$

Warning, expecting only range variable t in expression y(t)-`#mover(mi("y"),mo("^"))`(t) to be plotted but found names [y, `#mover(mi("y"),mo("^"))`]



> $\frac{\partial}{\partial t}(K(x,t)) = 0.11 \cdot v(t) \cdot prob$

$$\frac{\partial}{\partial t} K(x,t) = \frac{0.009166666667\ (y(t) - \hat{y}(t))\ \sqrt{2}\ e^{-\frac{x^2}{72}}}{\sqrt{\pi}} \quad \textbf{(9)}$$

> `map(int, 0.009166666667 * (y(t) - `#mover(mi("y",mathcolor = "blue"),mo("^",mathcolor = "blue"))`(t)) * sqrt(2) * exp(-x^2/72)/sqrt(Pi), t)`

$$0.005171737849\ t^4 \left(\int (y(t) - \hat{y}(t))\ dt\right) \sqrt{2}\ e^{-\frac{x^2}{72}} \quad \textbf{(10)}$$

> $K(x,t)$

$$K(x,t) \quad \textbf{(11)}$$

>