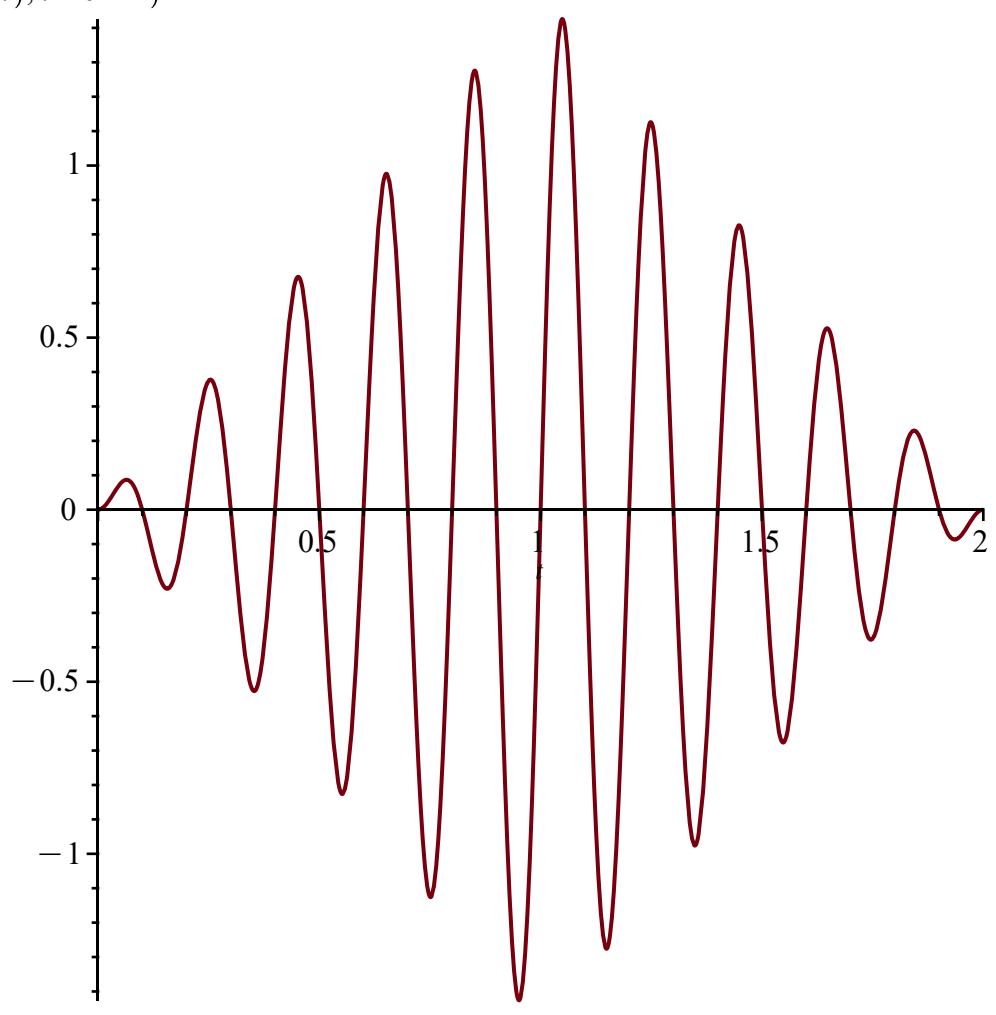


```
> with(Statistics) :
> infolevel[Statistics] := 1
infolevelStatistics := 1 (1)
```

```
> 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))
```

$$y_a := t \mapsto \begin{cases} \text{Sine}(1.5 \cdot t, 10 \cdot \pi, 0, 0) & 0 \leq t \leq 1 \\ \text{Sine}(1.5 \cdot (2 - t), 10 \cdot \pi, 0, 0) & 1 \leq t \leq 2 \end{cases} \quad (2)$$

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

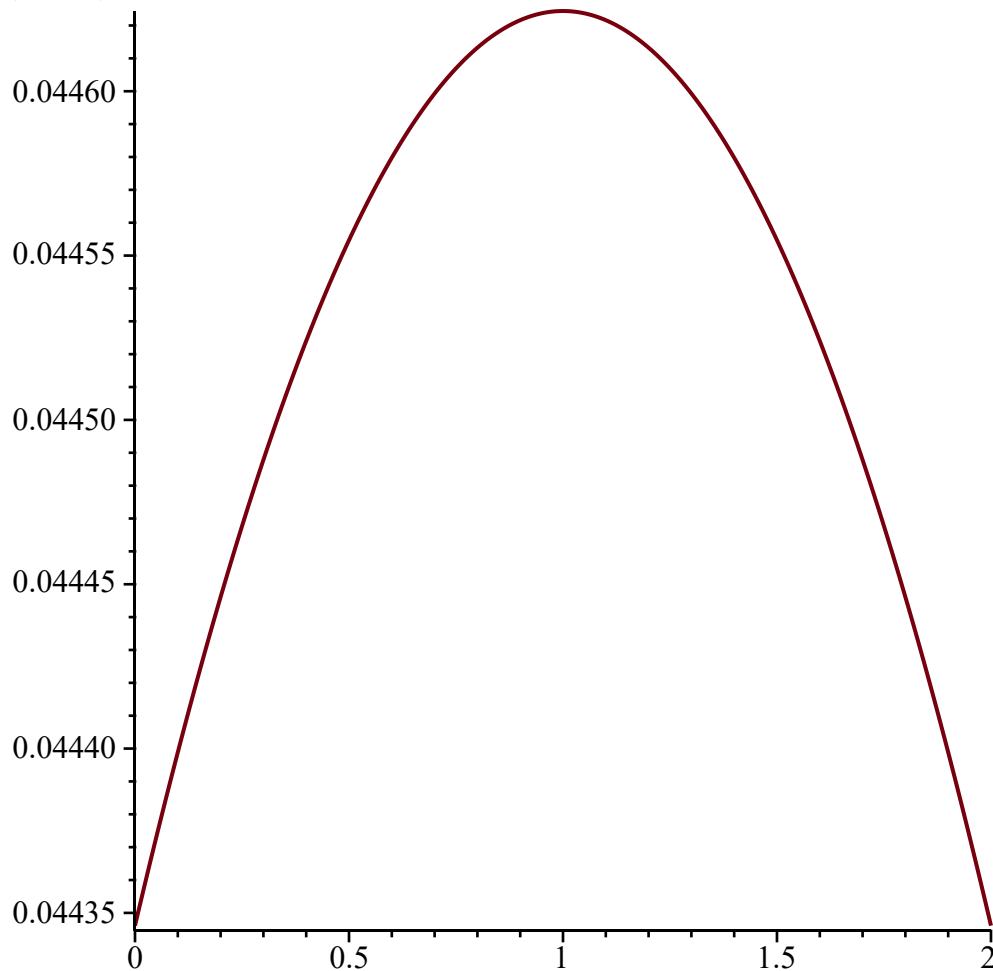


```
> with(stats) :
> mu(t) := statevalf[pdf, normald[1, 2 * 4.47]];
```

$$\mu := t \mapsto \text{statevalf}_{pdf, normald}_{1, 8.94}$$

(3)

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



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

$$y(t) = \left(\left(\begin{cases} 0 & t < 0 \\ 1.5 t \sin(10 \pi t) & \text{otherwise} \end{cases} \quad \begin{matrix} 0 \leq t \leq 1 \\ 1 \leq t \leq 2 \end{matrix} \right) + \text{statevalf}_{pdf, normald}_{1, 8.94} \right) \quad (4)$$

> plot((y_a(t) + mu(t)), 0..2)

Error, (in plot) procedure expected, as range contains no plotting variable

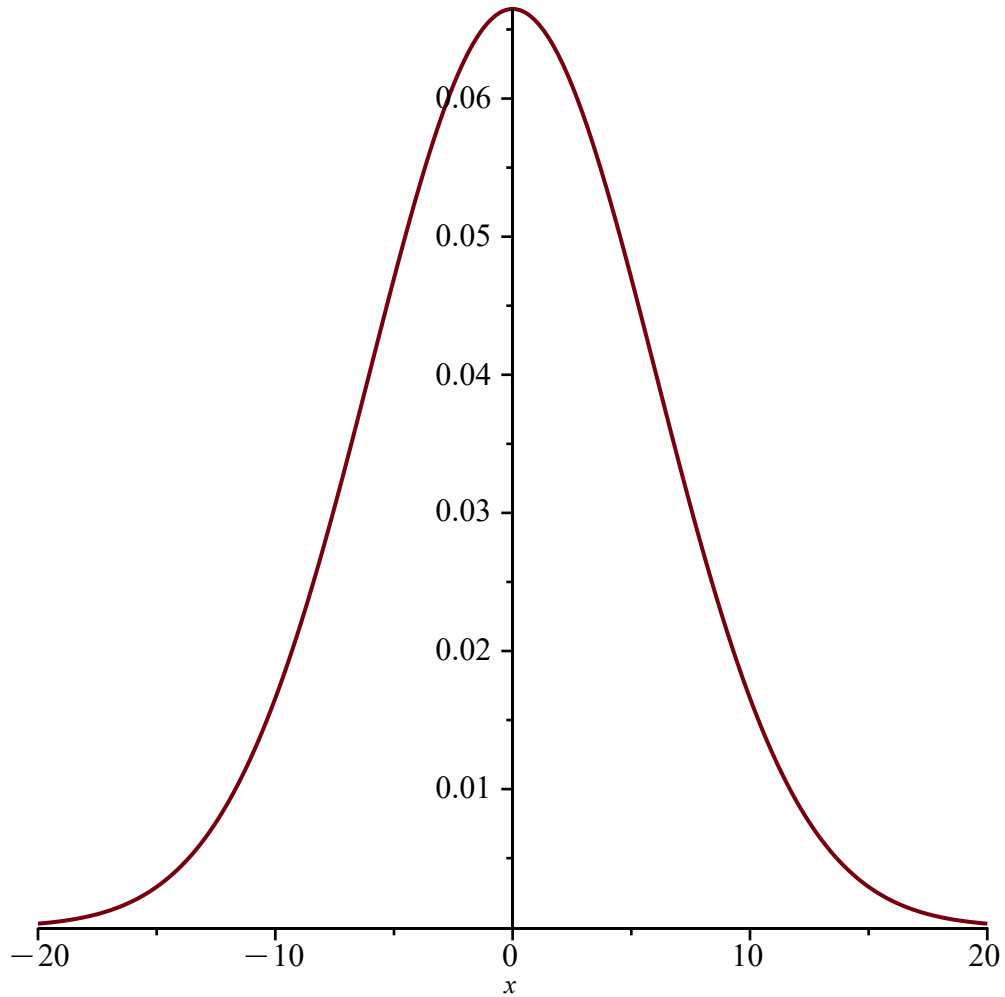
> with(Statistics) :

> prob := PDF(RandomVariable(NormalDistribution(0, 6)), x)

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

(5)

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



> `int(x*prob, x)`

$$-\frac{3\sqrt{2}e^{-\frac{x^2}{72}}}{\sqrt{\pi}} \quad (6)$$

>

> `y_hat(t) = int(x*prob, x = 0 .. 20)`

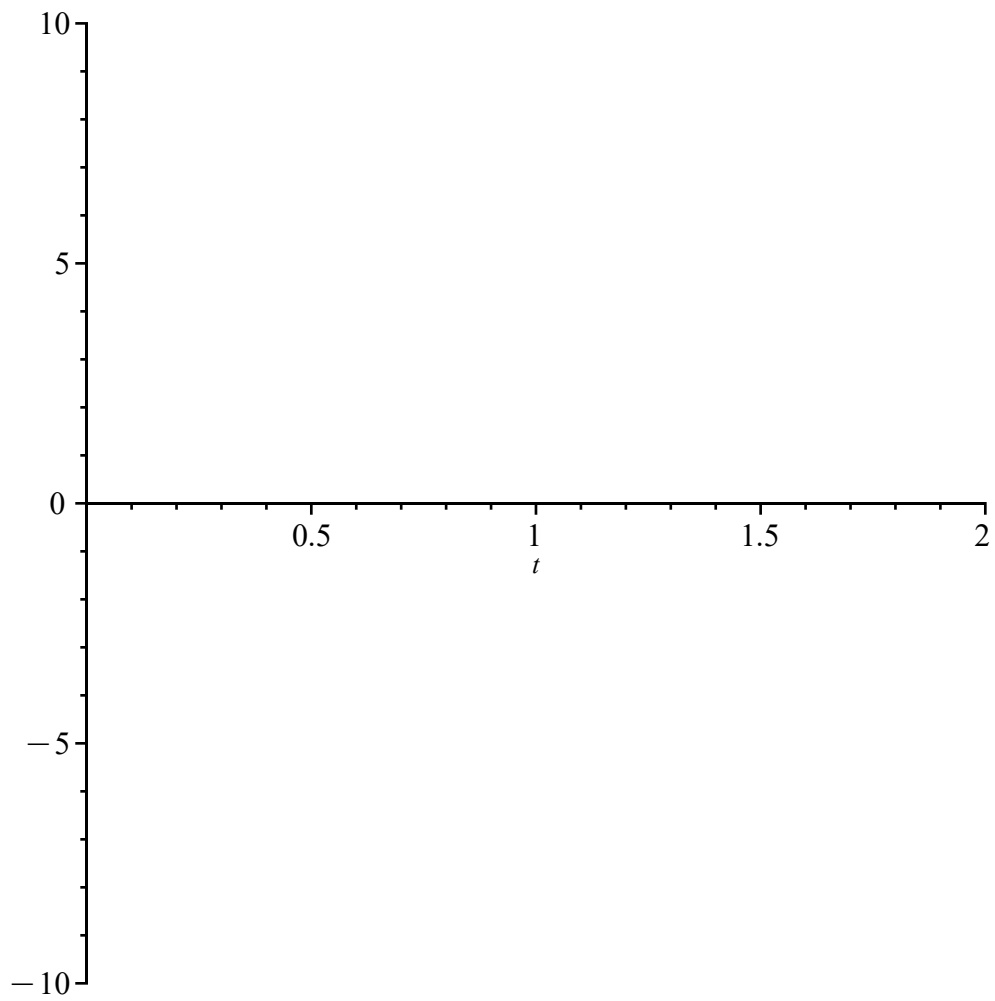
$$\hat{y}(t) = -\frac{3\sqrt{2}\left(e^{-\frac{50}{9}} - 1\right)}{\sqrt{\pi}} \quad (7)$$

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

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

> `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("^"))]`



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

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

> $map(int, (9), t)$

9. t

(10)

>