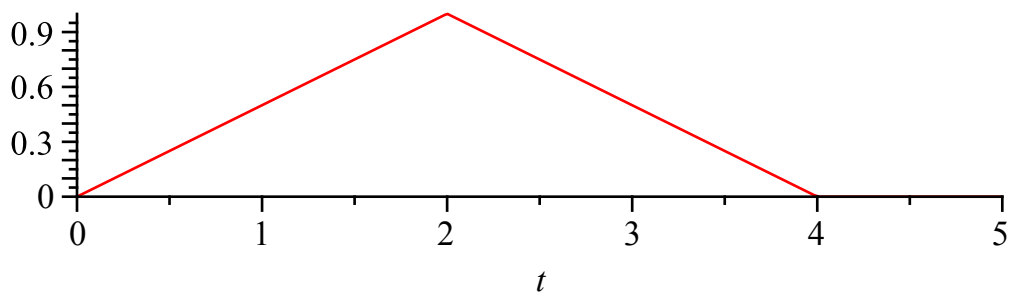
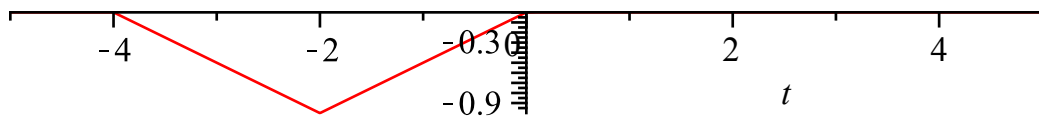


```
> restart
```

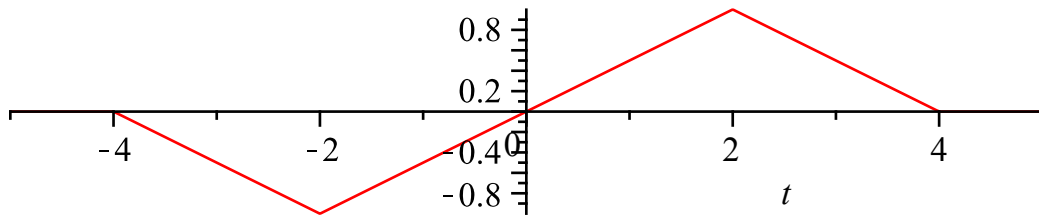
```
> f :=  $\left(\frac{1}{2}\right) \cdot t \cdot \text{Heaviside}(t) - 2 \cdot \left(\frac{1}{2}\right) \cdot (t - 2) \cdot \text{Heaviside}(t - 2) + \left(\frac{1}{2}\right) \cdot (t - 4) \cdot \text{Heaviside}(t - 4)$  : plot(f, t = 0 .. 5, scaling = CONSTRAINED)
```



```
> g :=  $-\left(\frac{1}{2}\right) \cdot (t + 4) \cdot \text{Heaviside}(t + 4) + 2 \cdot \left(\frac{1}{2}\right) \cdot (t + 2) \cdot \text{Heaviside}(t + 2) - \left(\frac{1}{2}\right) \cdot t \cdot \text{Heaviside}(t)$  : plot(g, t = -5 .. 5, scaling = CONSTRAINED)
```



> $h := f + g : \text{plot}(h, t = -5 \dots 5, \text{scaling} = \text{CONSTRAINED})$



$$\text{--} > L := 5 \qquad L := 5 \qquad (1)$$

$$\text{--} > a_0 := \left(\frac{1}{L}\right) \cdot \text{int}(h, t = -L..L) \qquad a_0 := 0 \qquad (2)$$

$$\text{--} > a_n := \left(\frac{1}{L}\right) \cdot \text{int}\left(h \cdot \cos\left(\frac{n \cdot \text{Pi} \cdot t}{L}\right), t = -L..L\right) \qquad a_n := 0 \qquad (3)$$

$$\text{--} > b_n := \left(\frac{1}{L}\right) \cdot \text{int}\left(h \cdot \sin\left(\frac{n \cdot \text{Pi} \cdot t}{L}\right), t = -L..L\right)$$

$$b_n := \frac{5 \left(\sin\left(\frac{2}{5} n \pi\right) - \frac{2}{5} \cos\left(\frac{2}{5} n \pi\right) n \pi \right)}{n^2 \pi^2} + \frac{4 \cos\left(\frac{2}{5} n \pi\right)}{n \pi}$$

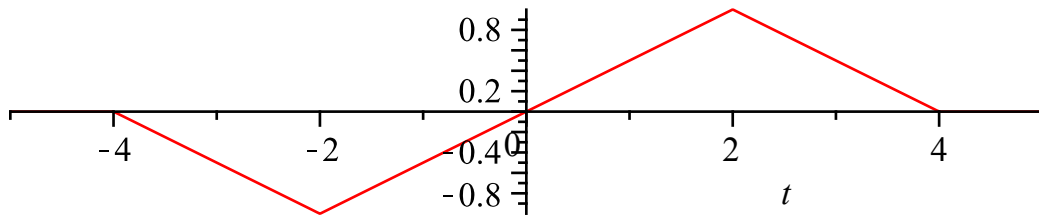
$$- \frac{5}{2} \frac{\sin\left(\frac{4}{5} n \pi\right) - \frac{4}{5} \cos\left(\frac{4}{5} n \pi\right) n \pi}{n^2 \pi^2} - \frac{4 \cos\left(\frac{4}{5} n \pi\right)}{n \pi}$$

$$(4)$$

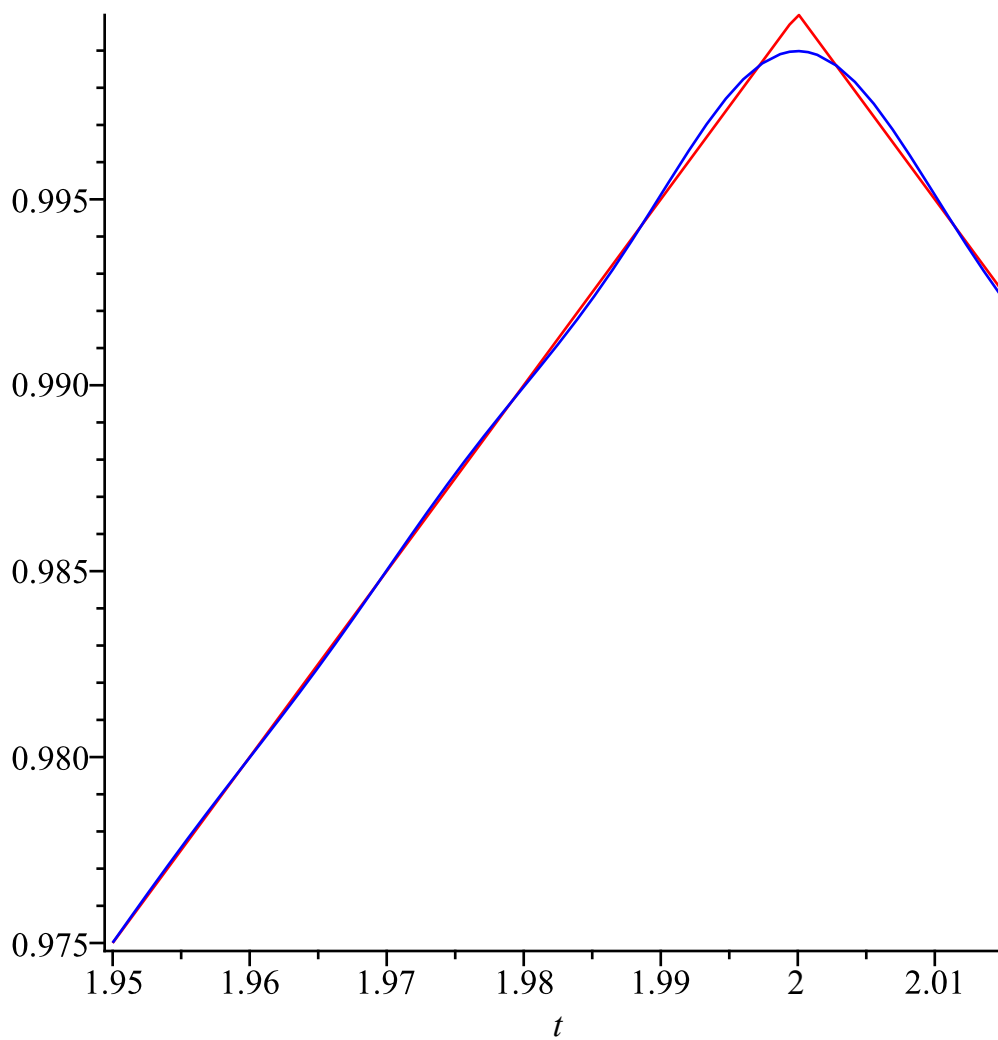
$$+ \frac{5}{2} \frac{-\sin\left(\frac{4}{5} n \pi\right) + \frac{4}{5} \cos\left(\frac{4}{5} n \pi\right) n \pi}{n^2 \pi^2}$$

$$- \frac{5 \left(-\sin\left(\frac{2}{5} n \pi\right) + \frac{2}{5} \cos\left(\frac{2}{5} n \pi\right) n \pi\right)}{n^2 \pi^2}$$

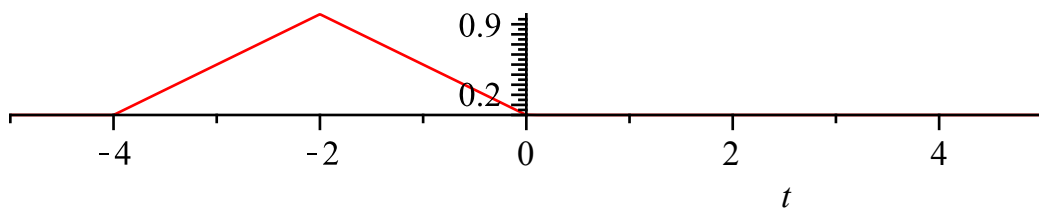
```
> STF_seno := sum(b_n * sin(n * Pi * t / L), n = 1 .. 500) :
> plot(STF_seno, t = -L .. L, scaling = CONSTRAINED)
```



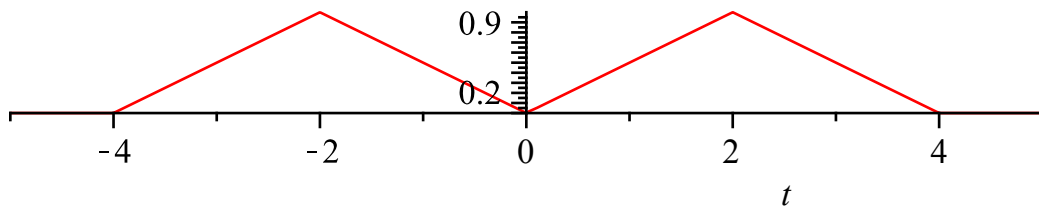
```
> plot([f, STF_seno], t = 1.95 .. 2.015, color = [red, blue])
```



```
> j := (1/2) * (t + 4) * Heaviside(t + 4) - 2 * (1/2) * (t + 2) * Heaviside(t + 2) + (1/2) * t
      * Heaviside(t) : plot(j, t = -5 .. 5, scaling = CONSTRAINED)
```



=
> $k := f + j : \text{plot}(k, t = -5 \dots 5, \text{scaling} = \text{CONSTRAINED})$



$$\begin{aligned}
 &> aa_n := \left(\frac{1}{L} \right) \cdot \text{int} \left(k \cdot \cos \left(\frac{n \cdot \text{Pi} \cdot t}{L} \right), t = -L..L \right) \\
 aa_n &:= -\frac{5}{n^2 \pi^2} + \frac{10 \left(\cos \left(\frac{2}{5} n \pi \right) + \frac{2}{5} n \pi \sin \left(\frac{2}{5} n \pi \right) \right)}{n^2 \pi^2} - \frac{4 \sin \left(\frac{2}{5} n \pi \right)}{n \pi}
 \end{aligned} \tag{5}$$

$$\begin{aligned}
 &\quad -\frac{5 \left(\cos \left(\frac{4}{5} n \pi \right) + \frac{4}{5} n \pi \sin \left(\frac{4}{5} n \pi \right) \right)}{n^2 \pi^2} + \frac{4 \sin \left(\frac{4}{5} n \pi \right)}{n \pi}
 \end{aligned}$$

$$\begin{aligned}
 &> bb_n := \text{simplify} \left(\left(\frac{1}{L} \right) \cdot \text{int} \left(k \cdot \sin \left(\frac{n \cdot \text{Pi} \cdot t}{L} \right), t = -L..L \right) \right) \\
 &\quad bb_n := 0
 \end{aligned} \tag{6}$$

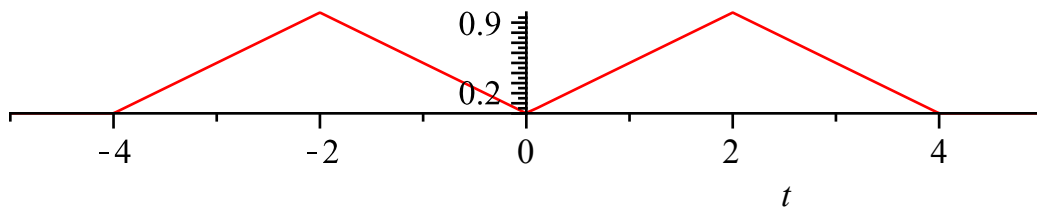
$$\begin{aligned}
 &> aa_0 := \left(\frac{1}{L} \right) \cdot \text{int}(k, t = -L..L) \\
 &\quad aa_0 := \frac{4}{5}
 \end{aligned} \tag{7}$$

$$> CC := \frac{aa_0}{2}$$

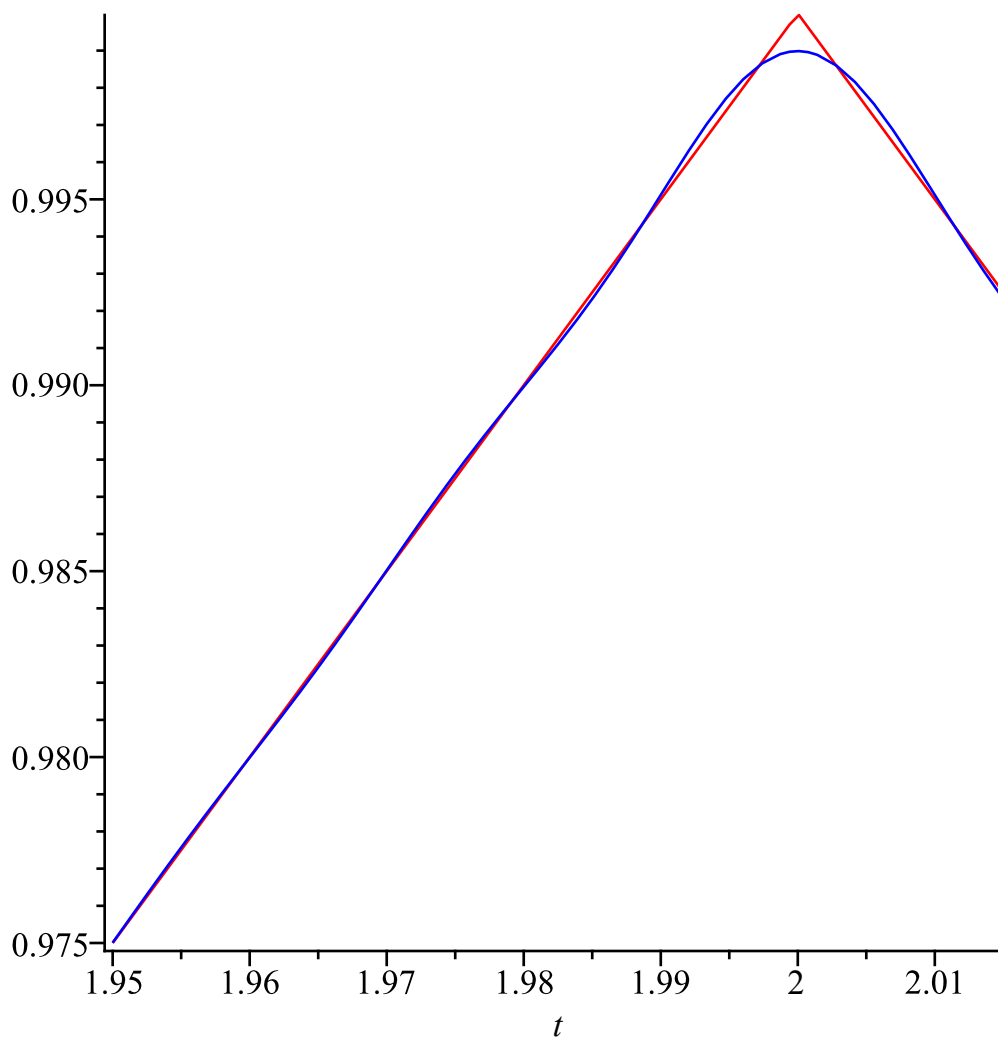
$$CC := \frac{2}{5}$$

(8)

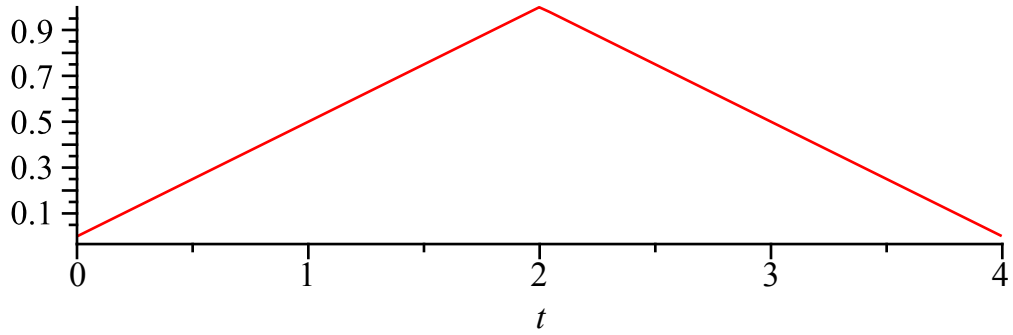
```
> STFcos := CC + sum(aan · cos( $\frac{n \cdot \text{Pi} \cdot t}{L}$ ), n = 1 .. 500) :
> plot(STFcos, t = -L .. L, scaling = CONSTRAINED)
```



```
> plot([f, STFcos], t = 1.95 .. 2.015, color = [red, blue])
```

=
> `plot(f, t=0..4, scaling=CONSTRAINED)`



> $LL := 2$

$LL := 2$

(9)

> $aaa_0 := \left(\frac{1}{LL} \right) \cdot \text{int}(f, t=0..2 \cdot LL)$

$aaa_0 := 1$

(10)

> $CCC := \frac{aaa_0}{2}$

$CCC := \frac{1}{2}$

(11)

> $aaa_n := \left(\frac{1}{LL} \right) \cdot \text{int} \left(f \cdot \cos \left(\frac{n \cdot \text{Pi} \cdot t}{LL} \right), t=0..2 \cdot LL \right)$

$aaa_n := \frac{1}{2} \frac{-4 \cos(n \pi)^2 + 4 \cos(n \pi)}{n^2 \pi^2}$

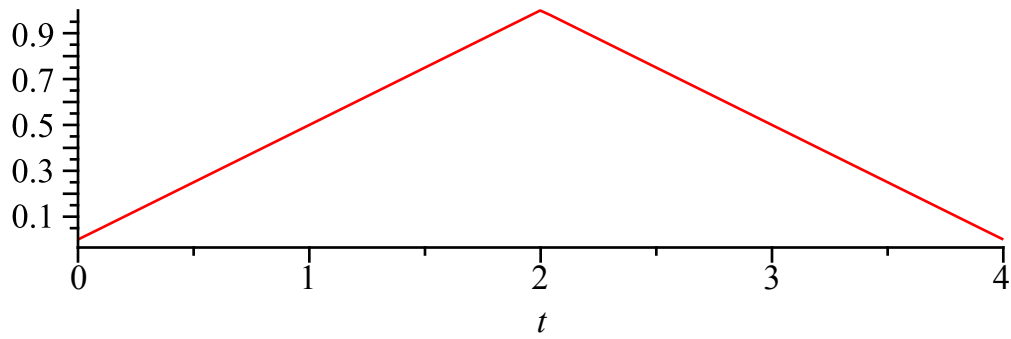
(12)

> $bbb_n := \left(\frac{1}{LL} \right) \cdot \text{int} \left(f \cdot \sin \left(\frac{n \cdot \text{Pi} \cdot t}{LL} \right), t=0..2 \cdot LL \right)$

(13)

$$bbb_n := \frac{1}{2} \frac{-4 \sin(n \pi) \cos(n \pi) + 4 \sin(n \pi)}{n^2 \pi^2} \quad (13)$$

```
> STF500 := CCC + sum( aaan · cos(  $\frac{n \cdot \text{Pi} \cdot t}{LL}$  ) + bbbn · sin(  $\frac{n \cdot \text{Pi} \cdot t}{LL}$  ), n = 1 ..500 ) :
> plot( STF500, t = 0 ..4, scaling = CONSTRAINED)
```



```
>
>
```