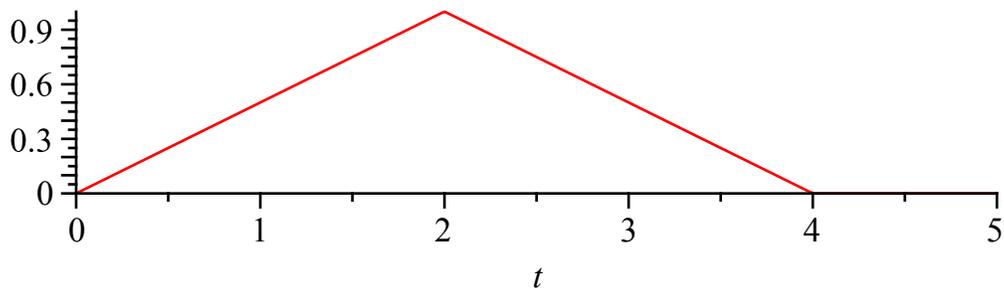
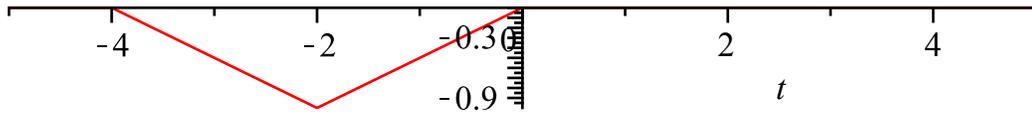


```
> restart
```

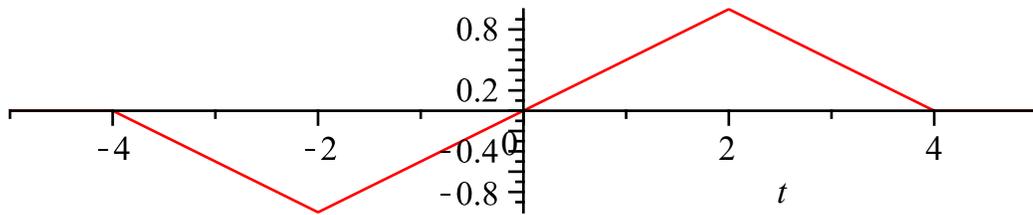
```
> f :=  $\left(\frac{1}{2}\right) \cdot t \cdot \text{Heaviside}(t) - 2 \cdot \left(\frac{1}{2}\right) \cdot (t - 2) \cdot \text{Heaviside}(t - 2) + \left(\frac{1}{2}\right) \cdot (t - 4) \cdot \text{Heaviside}(t - 4) : \text{plot}(f, t = 0 .. 5, \text{scaling} = \text{CONSTRAINED})$ 
```



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



`> h := f + g : plot(h, t = -5 .. 5, scaling = CONSTRAINED)`



$$\text{> } L := 5$$

$$L := 5$$

(1)

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

$$a_0 := 0$$

(2)

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

$$a_n := 0$$

(3)

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

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

(4)

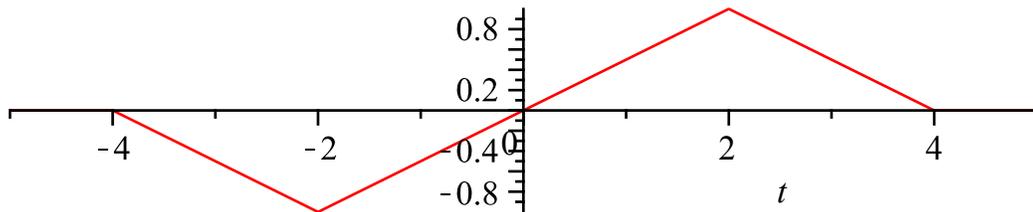
$$- \frac{5}{2} \frac{\sin\left(\frac{4}{5} n \pi\right) - \frac{4}{5} \cos\left(\frac{4}{5} n \pi\right) n \pi}{n^2 \pi^2} - \frac{4 \cos\left(\frac{4}{5} n \pi\right)}{n \pi}$$

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

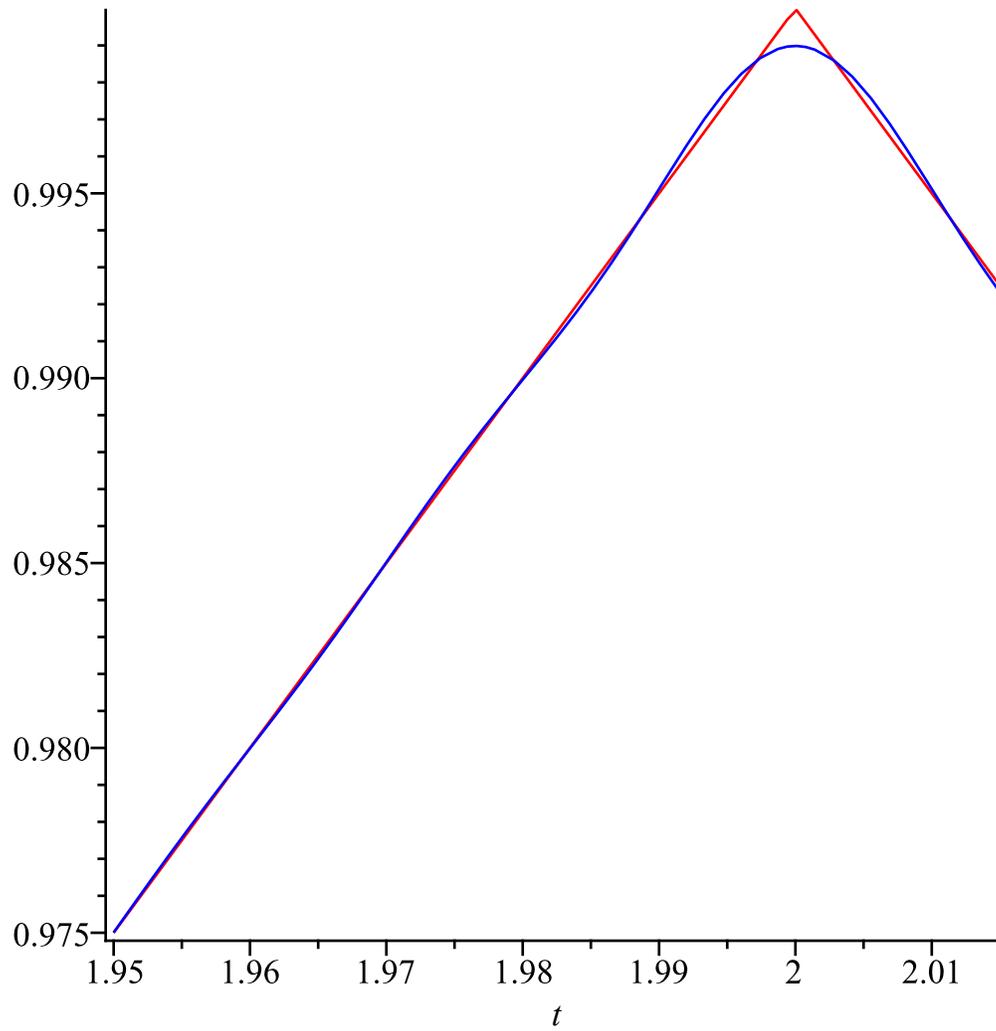
$$- \frac{5 \left(-\sin\left(\frac{2}{5} n \pi\right) + \frac{2}{5} \cos\left(\frac{2}{5} n \pi\right) n \pi\right)}{n^2 \pi^2}$$

>  $STF_{seno} := \text{sum}\left(b_n \cdot \sin\left(\frac{n \cdot \text{Pi} \cdot t}{L}\right), n = 1 .. 500\right) :$

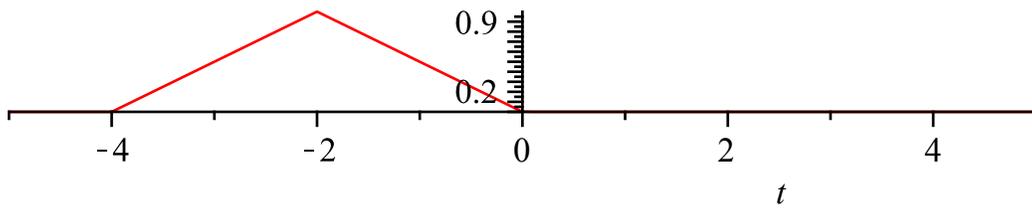
>  $\text{plot}(STF_{seno}, t = -L .. L, \text{scaling} = \text{CONSTRAINED})$



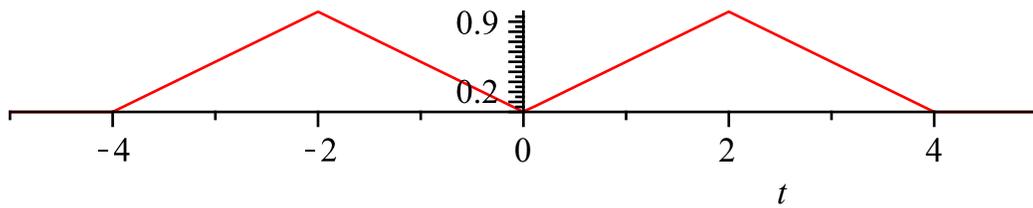
>  $\text{plot}([f, STF_{seno}], t = 1.95 .. 2.015, \text{color} = [\text{red}, \text{blue}])$



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



`> k := f + j : plot(k, t = -5 .. 5, scaling = CONSTRAINED)`



$$\text{> } aa_n := \left(\frac{1}{L}\right) \cdot \text{int}\left(k \cdot \cos\left(\frac{n \cdot \text{Pi} \cdot t}{L}\right), t = -L..L\right)$$

$$aa_n := -\frac{5}{n^2 \pi^2} + \frac{10 \left( \cos\left(\frac{2}{5} n \pi\right) + \frac{2}{5} n \pi \sin\left(\frac{2}{5} n \pi\right) \right)}{n^2 \pi^2} - \frac{4 \sin\left(\frac{2}{5} n \pi\right)}{n \pi} \quad (5)$$

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

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

$$bb_n := 0 \quad (6)$$

$$\text{> } aa_0 := \left(\frac{1}{L}\right) \cdot \text{int}(k, t = -L..L)$$

$$aa_0 := \frac{4}{5} \quad (7)$$

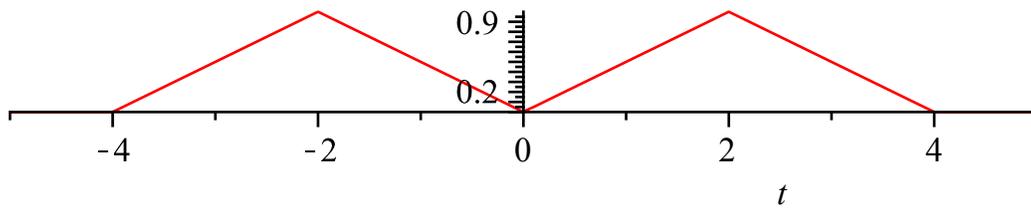
$$\text{> } CC := \frac{aa_0}{2}$$

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

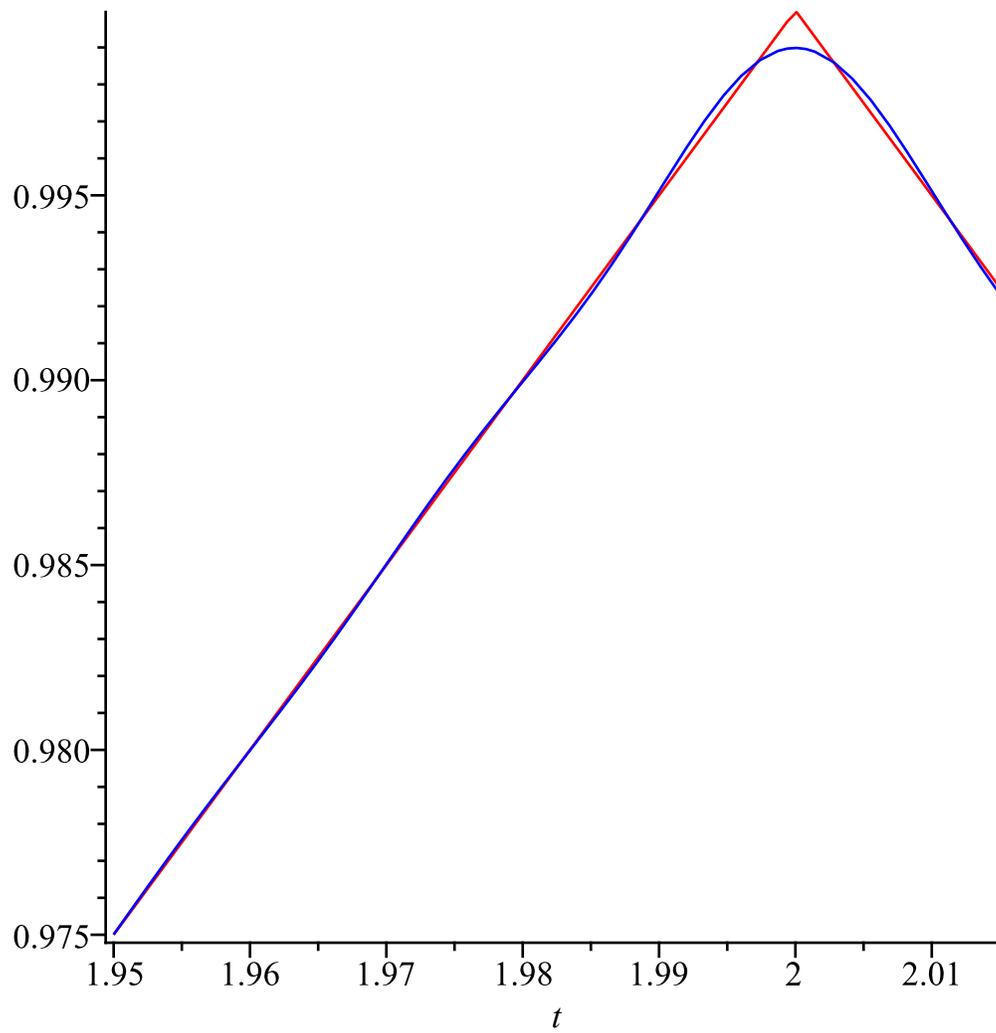
(8)

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

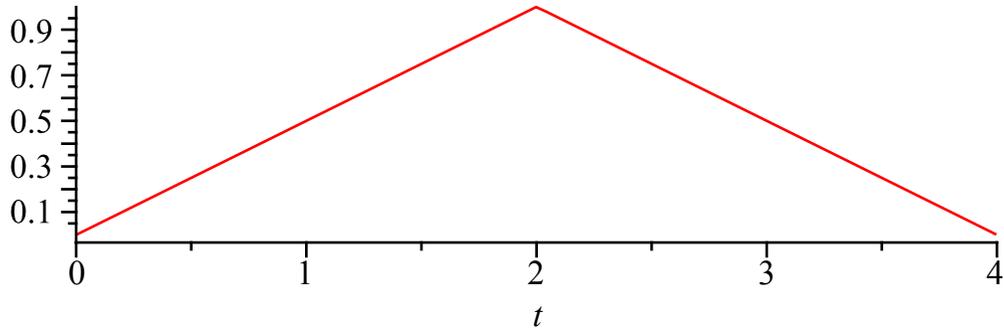
```
> plot(STFcos, t = -L .. L, scaling = CONSTRAINED)
```



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



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



$$\text{> } LL := 2$$

$$LL := 2$$

(9)

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

$$aaa_0 := 1$$

(10)

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

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

(11)

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

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

(12)

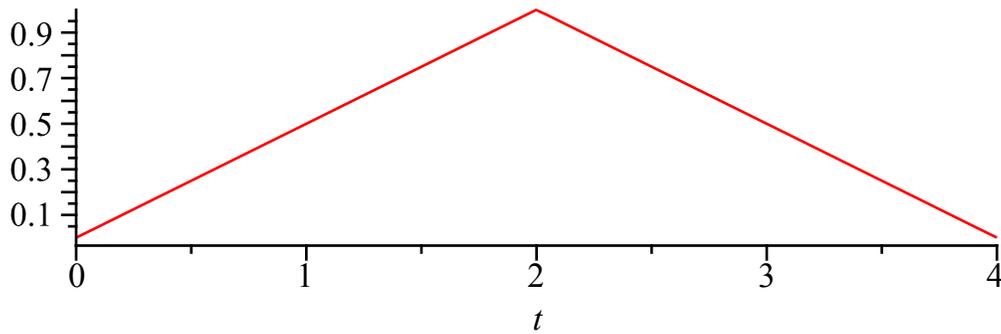
$$\text{> } bbb_n := \left( \frac{1}{LL} \right) \cdot \text{int} \left( f \cdot \sin \left( \frac{n \cdot \text{Pi} \cdot t}{LL} \right), t=0..2 \cdot LL \right)$$

(13)

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

(13)

- >  $STF_{500} := CCC + \text{sum}\left(aaa_n \cdot \cos\left(\frac{n \cdot \text{Pi} \cdot t}{LL}\right) + bbb_n \cdot \sin\left(\frac{n \cdot \text{Pi} \cdot t}{LL}\right), n = 1 .. 500\right) :$
- >  $\text{plot}(STF_{500}, t = 0 .. 4, \text{scaling} = \text{CONSTRAINED})$



>  
>