

> *with(plots); fe := proc(f) fnormal(evalf(f)); end:* (1)  
*[animate, animate3d, animatecurve, arrow, changecoords, complexplot, complexplot3d, conformal, conformal3d, contourplot, contourplot3d, coordplot, coordplot3d, densityplot, display, dualaxisplot, fieldplot, fieldplot3d, gradplot, gradplot3d, implicitplot, implicitplot3d, inequal, interactive, interactiveparams, intersectplot, listcontplot, listcontplot3d, listdensityplot, listplot, listplot3d, loglogplot, logplot, matrixplot, multiple, odeplot, pareto, plotcompare, pointplot, pointplot3d, polarplot, polygonplot, polygonplot3d, polyhedra\_supported, polyhedraplot, rootlocus, semilogplot, setcolors, setoptions, setoptions3d, spacecurve, sparsematrixplot, surfdata, textplot, textplot3d, tubeplot]*

> *b := proc(f, n)*  
*if n = 0 then 0;*  
*else fe*  $\left( \frac{2}{L} \cdot \int_0^L f \cdot \sin\left(\frac{n \cdot \pi \cdot x}{L}\right) dx \right);$   
*fi;*  
*end:*

> *fun\_odd := (f, n) →*  $\sum_{k=1}^n 'b(f, k) \cdot \sin\left(\frac{k \cdot \pi \cdot x}{L}\right),$   
*fun\_odd := (f, n) →*  $\sum_{k=1}^n 'b(f, k) \sin\left(\frac{k \pi x}{L}\right),$  (2)

> *L := 1; fun :=*  $\begin{cases} \frac{2x}{L} & 0 < x < \frac{L}{2} \\ \frac{2}{L}(L-x) & L > x \geq \frac{L}{2} \\ L := 1 \end{cases}$

*fun :=*  $\begin{cases} 2x & 0 < x \text{ and } x < \frac{1}{2} \\ 2 - 2x & x < 1 \text{ and } \frac{1}{2} \leq x \end{cases}$  (3)

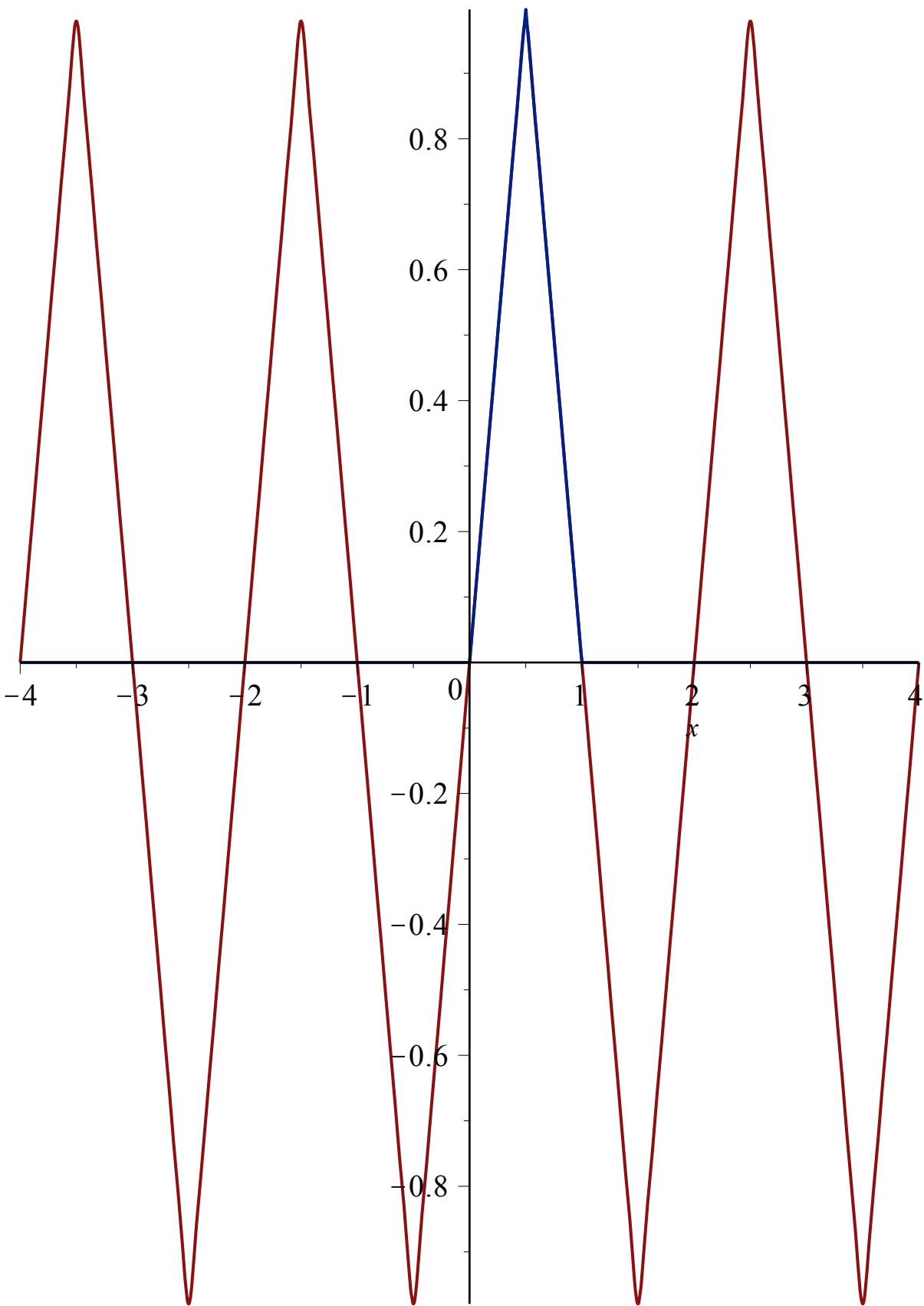
> *n := 20; fun\_odd(fun, n);*  
*n := 20*

$0.8105694688 \sin\left(\frac{\pi x}{L}\right) - 0.09006327431 \sin\left(\frac{3 \pi x}{L}\right) + 0.03242277875 \sin\left(\frac{5 \pi x}{L}\right)$  (4)  
 $- 0.01654223405 \sin\left(\frac{7 \pi x}{L}\right) + 0.01000703048 \sin\left(\frac{9 \pi x}{L}\right)$   
 $- 0.006698921230 \sin\left(\frac{11 \pi x}{L}\right) + 0.004796269047 \sin\left(\frac{13 \pi x}{L}\right)$

$$- 0.003602530973 \sin\left(\frac{15 \pi x}{L}\right) + 0.002804738646 \sin\left(\frac{17 \pi x}{L}\right)$$

$$- 0.002245344789 \sin\left(\frac{19 \pi x}{L}\right)$$

> `plot({fun, fun_odd(fun, n)}, x = -4·L .. 4·L)`

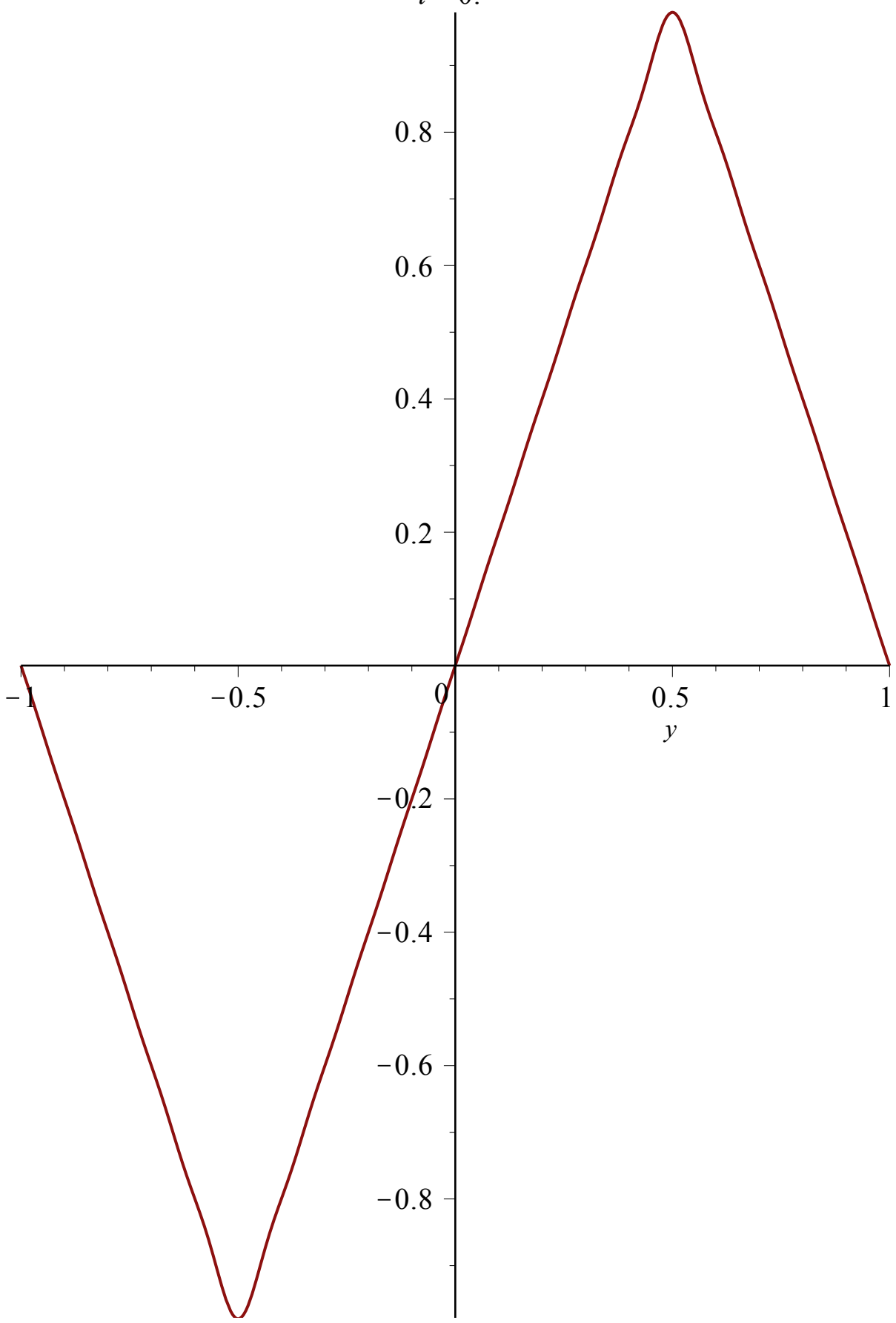


>  $c := 2$ ;  $fun\_sol\_1 := (y, t) \rightarrow eval(fun\_odd(fun, n), x = y + c \cdot t)$ ;  $fun\_sol\_2 := (y, t)$   
 $\rightarrow eval(fun\_odd(fun, n), x = y - c \cdot t)$

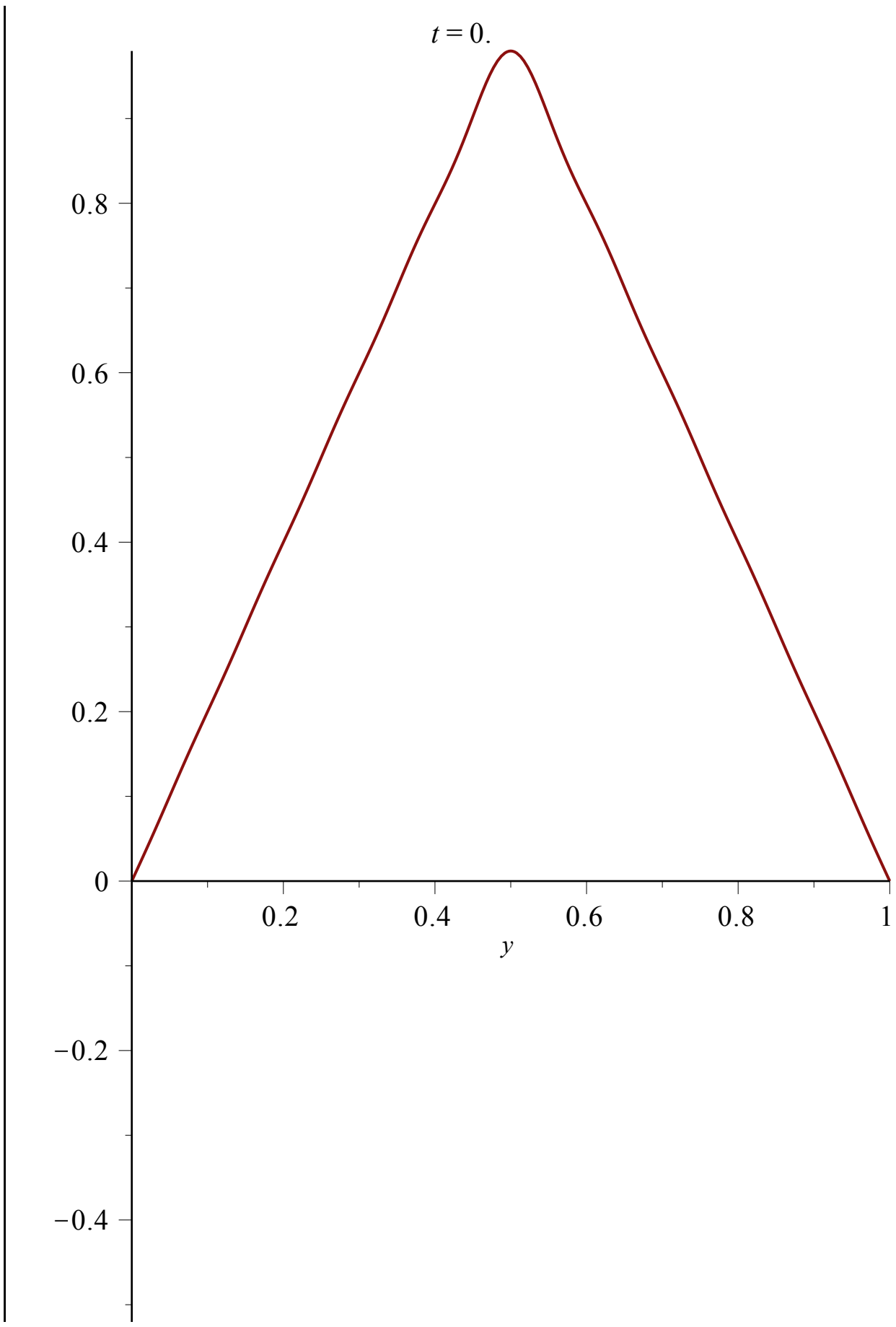
$$\begin{aligned} c &:= 2 \\ \text{fun\_sol\_1} &:= (y, t) \rightarrow \text{fun\_odd}(\text{fun}, n) \Big|_{x=y+ct} \\ \text{fun\_sol\_2} &:= (y, t) \rightarrow \text{fun\_odd}(\text{fun}, n) \Big|_{x=y-ct} \end{aligned} \quad (5)$$

> `animate(plot, [ {fun_sol_1(y, t), fun_sol_2(y, t)}, y=-L..L], t=0..100, frames = 100)`

$t = 0.$



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> animate(plot, [1/2 ( fun_sol_1(y, t) + fun_sol_2(y, t)), y = 0 .. L], t = 0 .. 100, frames = 100)
```



L >