```
> # Find Fourier cosine coefficients for
  # f(x)=1 on L/2<x<L, f(x)=0 elsewhere
> L:=1;
```

$$L := 1 \tag{1}$$

```
> f:=x->piecewise(x<L/2,0, x<L,1,0);
```

$$f := x \to piecewise\left(x < \frac{1}{2}\, L,\ 0,\ x < L,\ 1,\ 0\right) \tag{2}$$

```
> convert(f(x),piecewise,x);
```

$$\begin{cases} 0 & x < \frac{1}{2} \\ 1 & x < 1 \\ 0 & 1 \le x \end{cases} \tag{3}$$

```
> A:=n->(2/L)*int(f(x)*cos(n*Pi*x/L),x=0..L);
```

$$A := n \to \frac{2\left(\int_0^L f(x)\cos\left(\frac{n\pi x}{L}\right) dx\right)}{L} \tag{4}$$

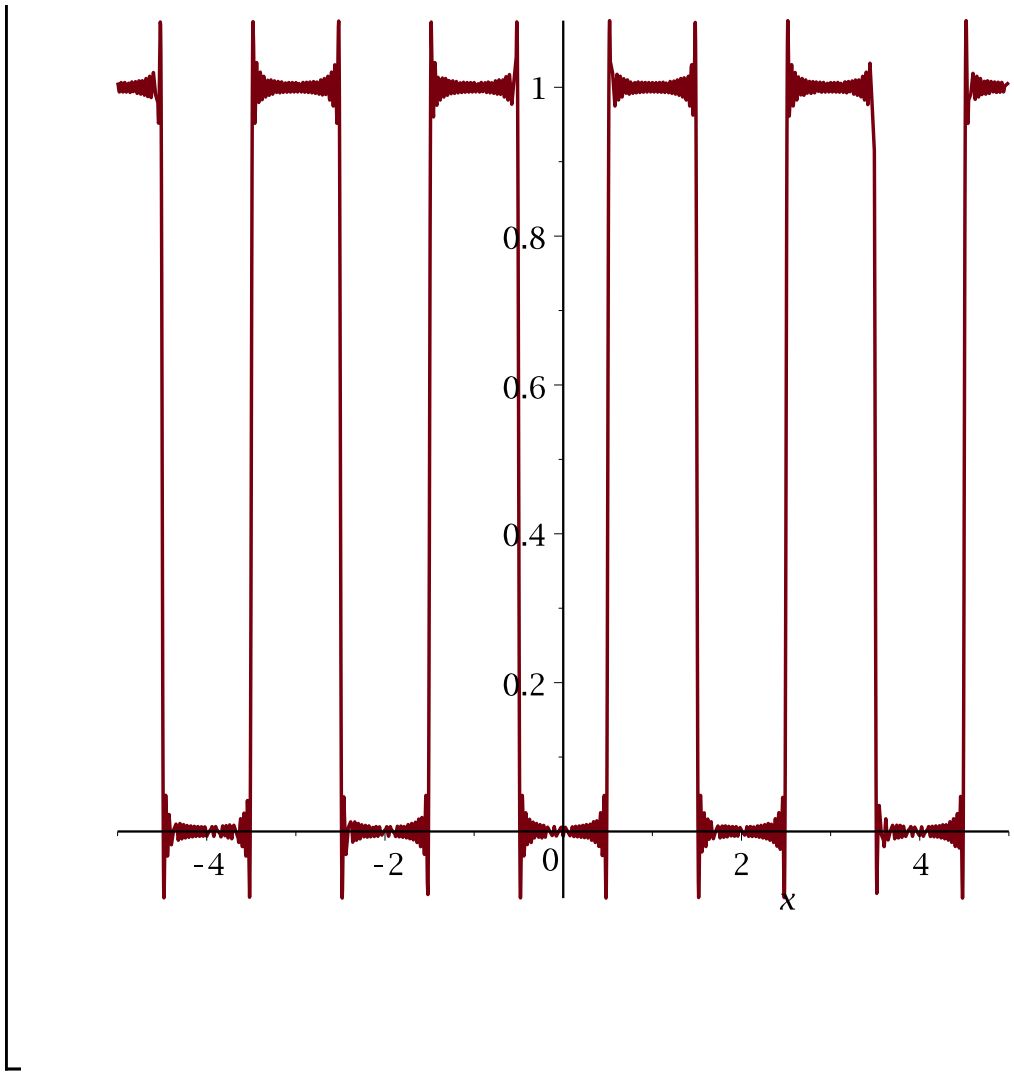
```
> A0:=(1/L)*int(f(x),x=0..L);
```

$$A0 := \frac{1}{2} \tag{5}$$

```
> # Truncated cosine series T(x,n)
> T:=(x,n)->A0+sum(A(k)*cos(k*Pi*x/L),k=1..n);
```

$$T := (x, n) \to A0 + \sum_{k=1}^{n} A(k)\cos\left(\frac{k\pi x}{L}\right) \tag{6}$$

```
> plot(T(x,50),x=-5*L..5*L);
```


1
0.8
0.6
0.4
0.2
-4
-2
0
2
4
x