```
> # Find Fourier cosine coefficients for
  # f(x)=1 on L/2<x<L, f(x)=0 elsewhere
> L:=1;
> f:=x->piecewise(x<0,x^3, exp(-x));
```

$$f := x \to piecewise(x < 0, x^3, e^{-x}) \tag{1}$$

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

$$\begin{cases} x^3 & x < 0 \\ e^{-x} & 0 \le x \end{cases} \tag{2}$$

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

$$\begin{cases} e^{x} & x \le 0 \\ -x^3 & 0 < x \end{cases} \tag{3}$$

```
> fODD:=x->(f(x)-f(-x))/2;fEVEN:=x->(f(x)+f(-x))/2;
```

$$fODD := x \to \frac{1}{2} f(x) - \frac{1}{2} f(-x)$$

$$fEVEN := x \to \frac{1}{2} f(x) + \frac{1}{2} f(-x) \tag{4}$$

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

$$\begin{cases} \frac{1}{2} x^3 - \frac{1}{2} e^{x} & x < 0 \\ 0 & x = 0 \\ \frac{1}{2} e^{-x} + \frac{1}{2} x^3 & 0 < x \end{cases} \tag{5}$$

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

$$\begin{cases} \frac{1}{2} x^3 + \frac{1}{2} e^{x} & x < 0 \\ 1 & x = 0 \\ \frac{1}{2} e^{-x} - \frac{1}{2} x^3 & 0 < x \end{cases} \tag{6}$$