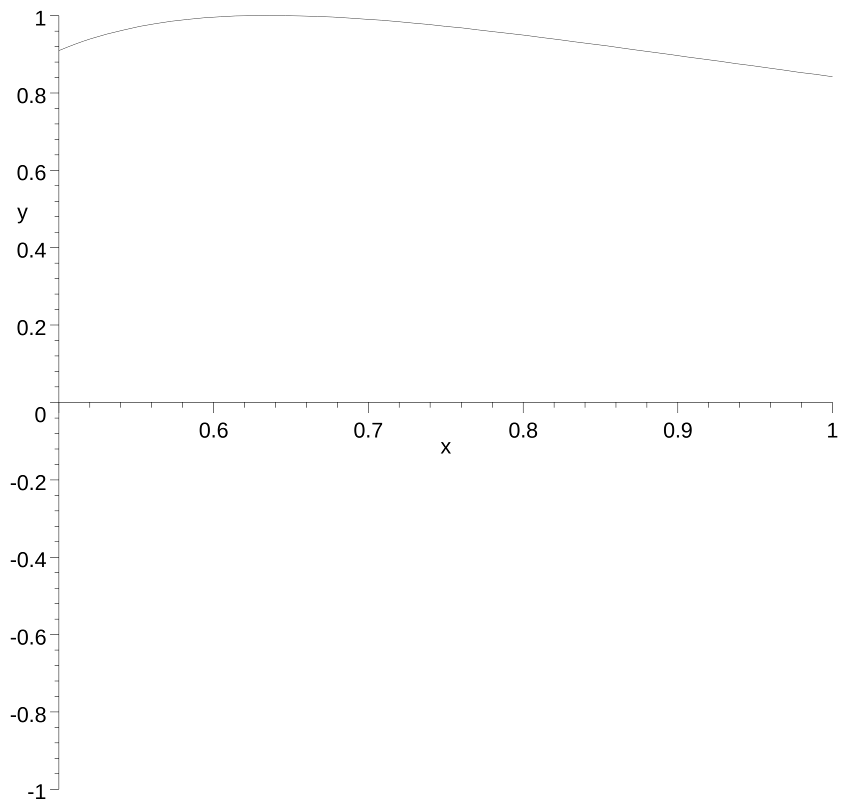
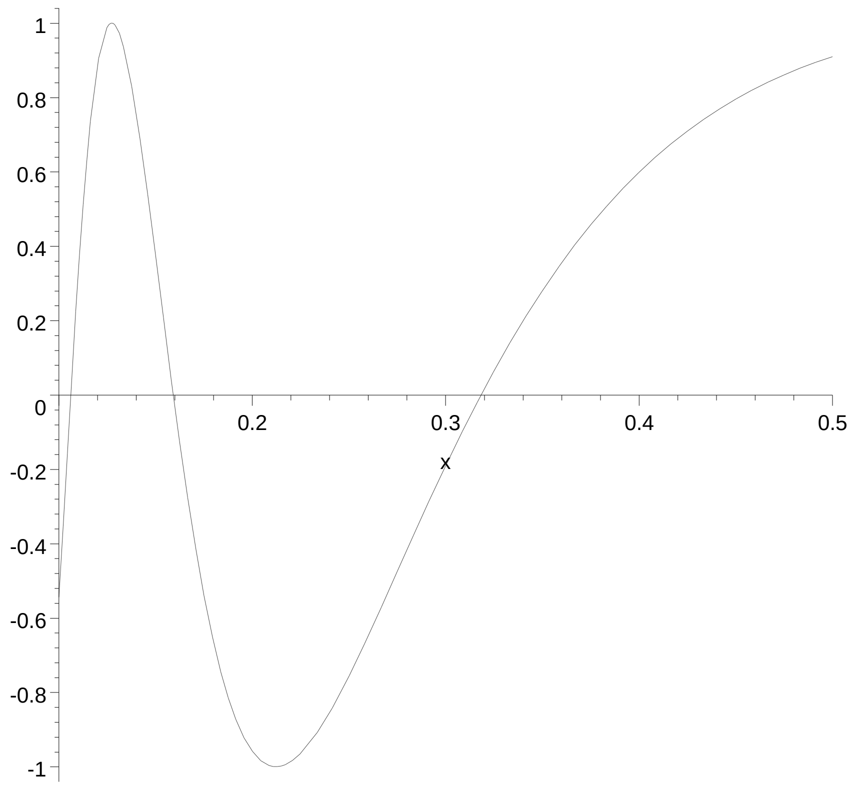
```
> # We examine here the behavior of the function sin(1/x) near x=0
> f := x -> sin(1/x);
```

$$f := x \rightarrow \sin\left(\frac{1}{x}\right)$$

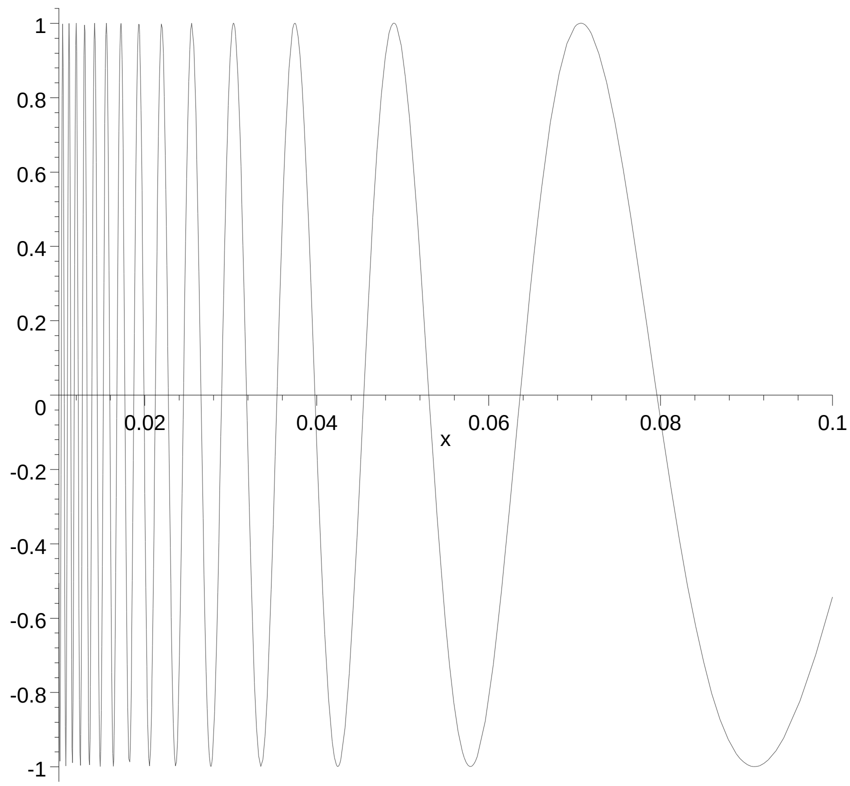
```
> # Let's see what's happening on the interval [0.5, 1]
> plot(f(x),x=0.5..1,y=-1..1);
```



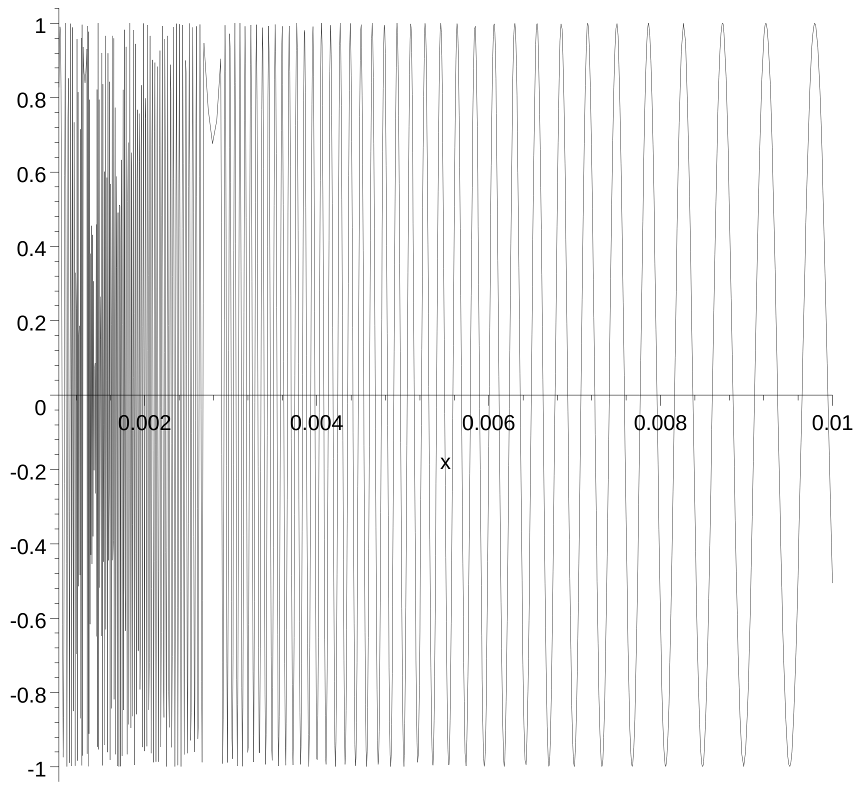

```
> # OK, not terribly interesting, so let's look on the interval
  [0.1,0.5]
> plot(f(x),x=0.1..0.5);
```



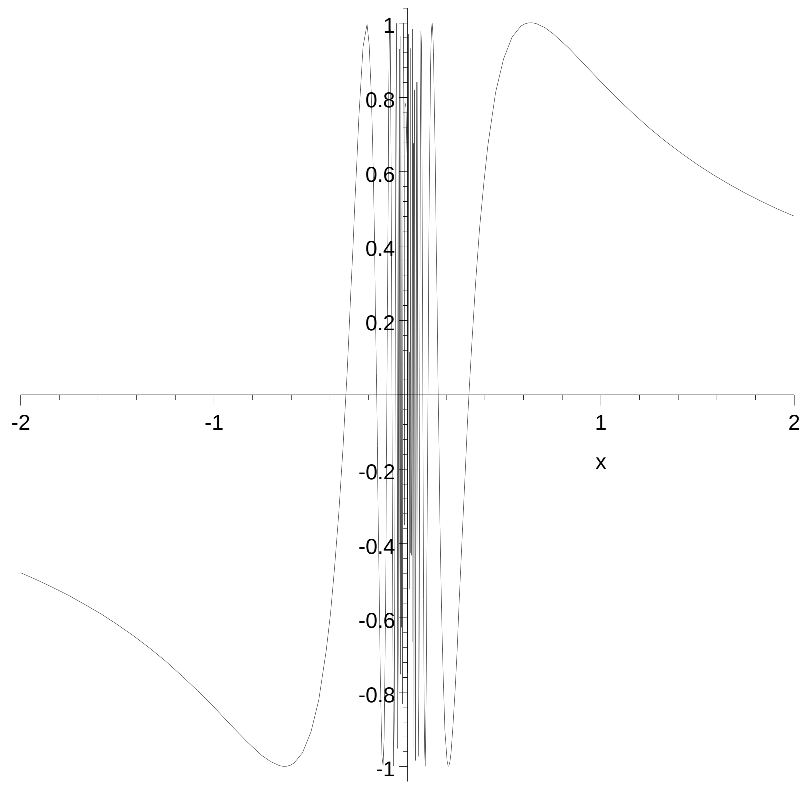

```
> # OK, one oscillation basically but now let’s try the interval
  [0.01,0.1]
> plot(f(x),x=0.01..0.1);
```



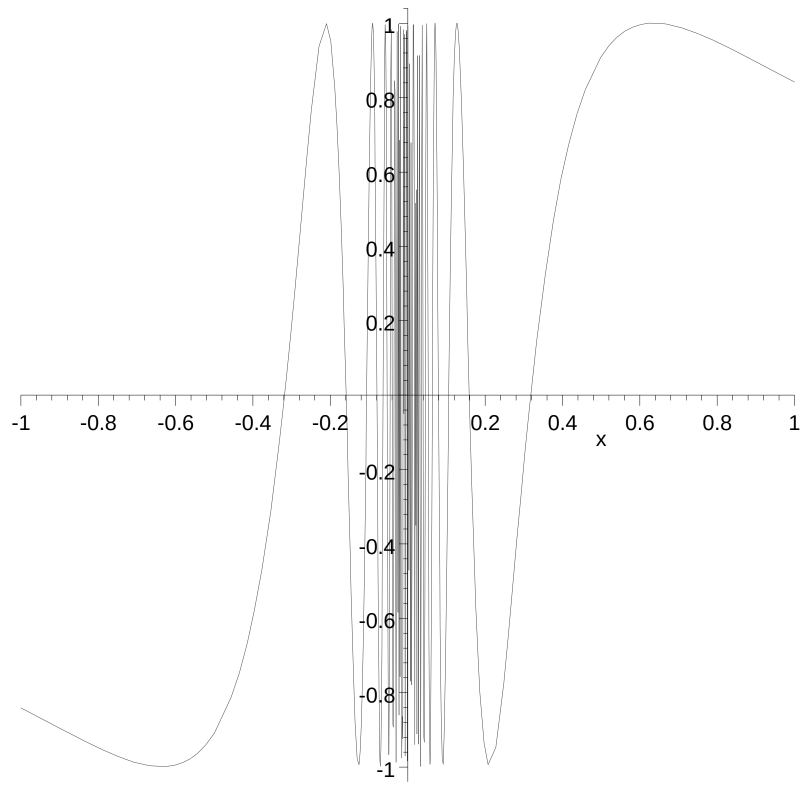

```
> # Notice how the number of oscillations has increased
> # Let’s look on an interval even closer to zero, say [0.001,0.01]
> plot(f(x),x=0.001..0.01);
```



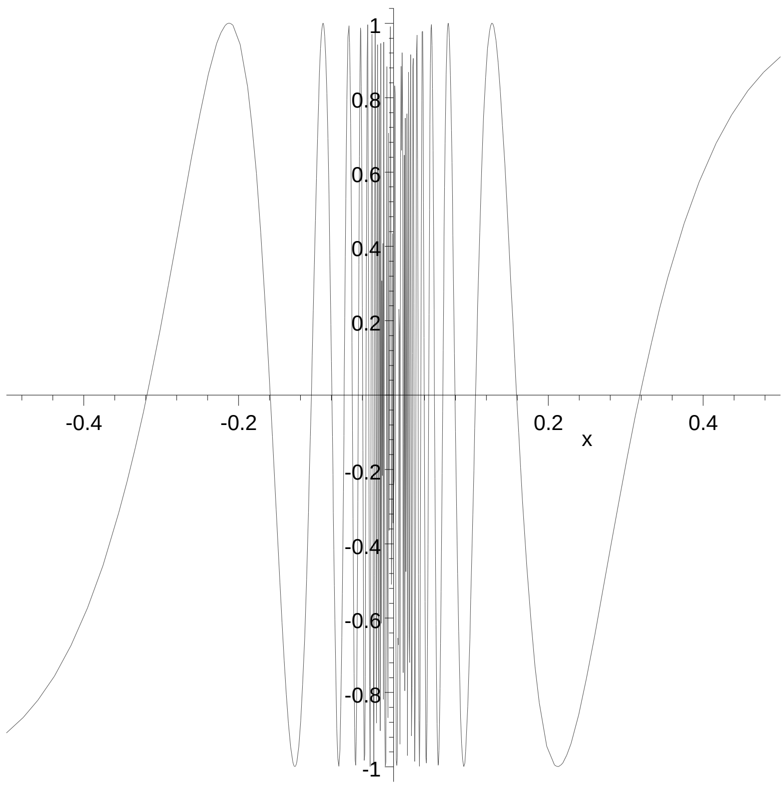

```
> #The blurry appearance near the left is due to the fact that
  sin(1/x) is
> #oscillating much more on this interval than on the previous one.
> #
> # Let's look at this now on symmetric intervals about x=0.
> plot(f(x),x=-2..2);
```



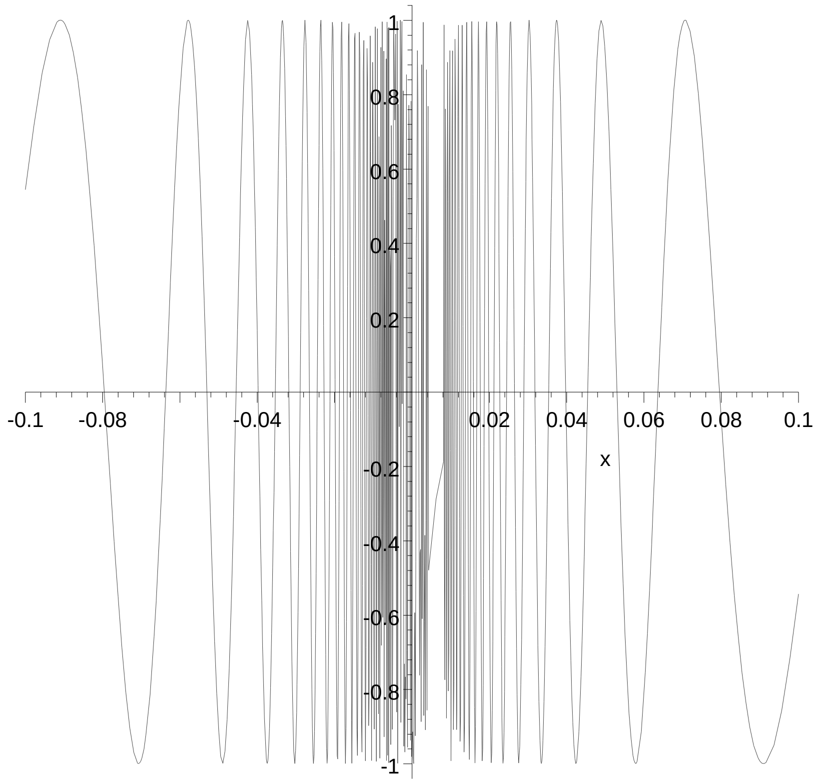

```
> plot(f(x),x=-1..1);
```



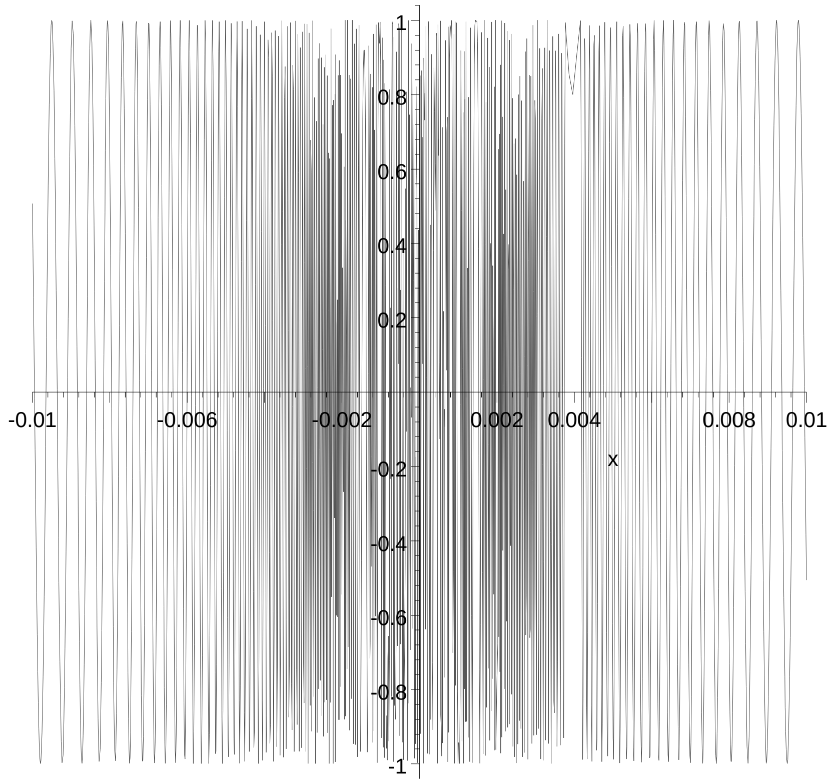

```
> plot(f(x),x=-0.5..0.5);
```



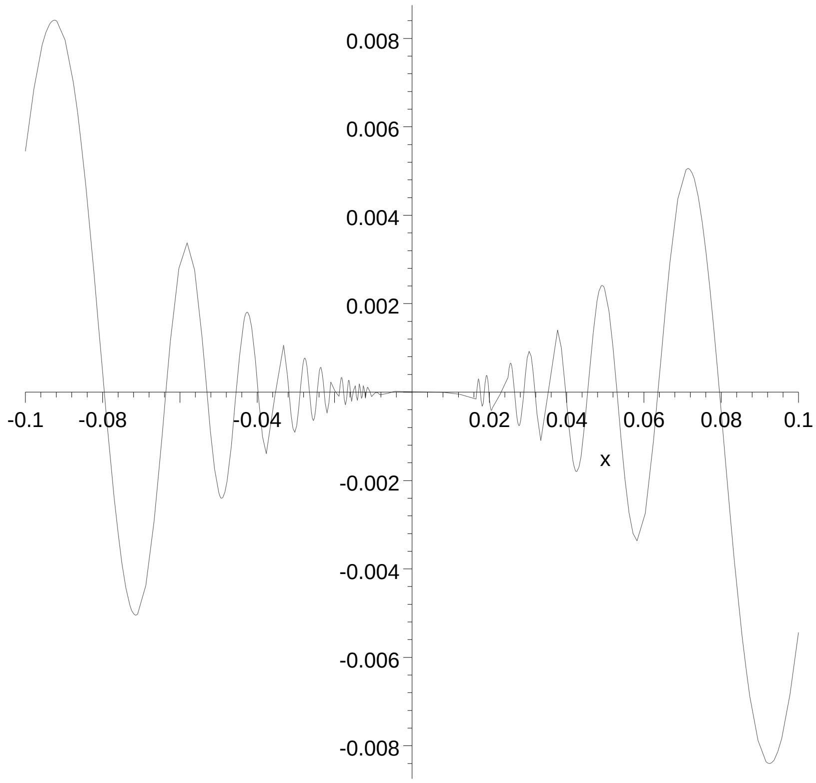

```
> plot(f(x),x=-0.1..0.1);
```



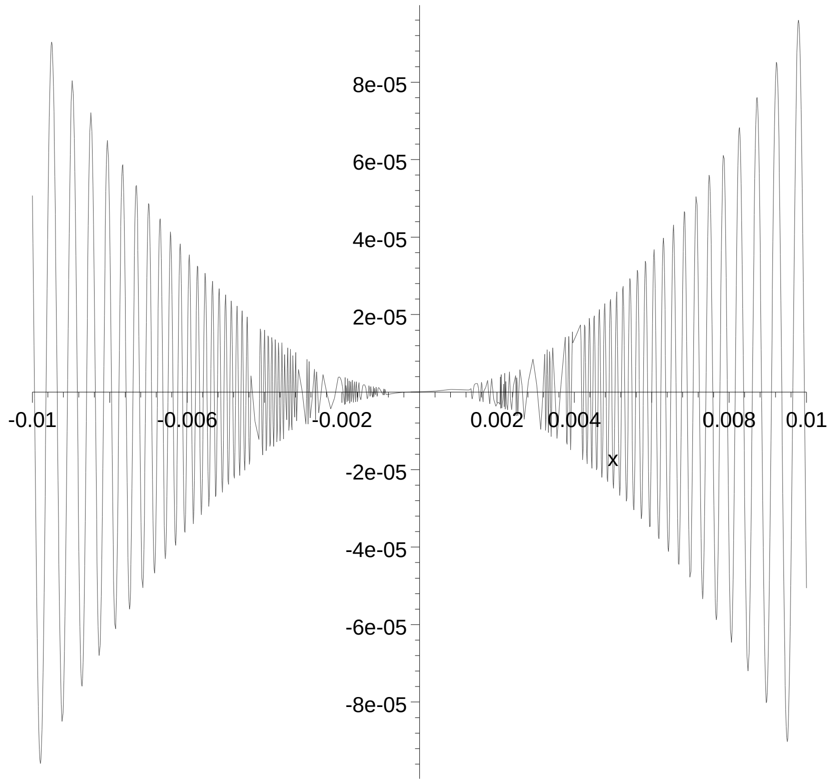

```
> plot(f(x),x=-0.01..0.01);
```




```
> # We see the same behavior, but from a little different
  perspective.
> #
> # Now, for comparison, let’s look at x^2 sin(1/x) for a moment.
> plot(x^2*sin(1/x),x=-0.1..0.1);
```




```
> # This function is not defined at zero, yet the x^2 term forces
  the limit
> # to exist. Let’s zoom in a little further to see.
> plot(x^2*sin(1/x),x=-0.01..0.01);
```


8e-05
6e-05
4e-05
2e-05
-0.01
-0.006
-0.002
0.002
0.004
0.008
0.01
x
-2e-05
-4e-05
-6e-05
-8e-05

>