



МИЭТ

Национальный исследовательский университет «МИЭТ»

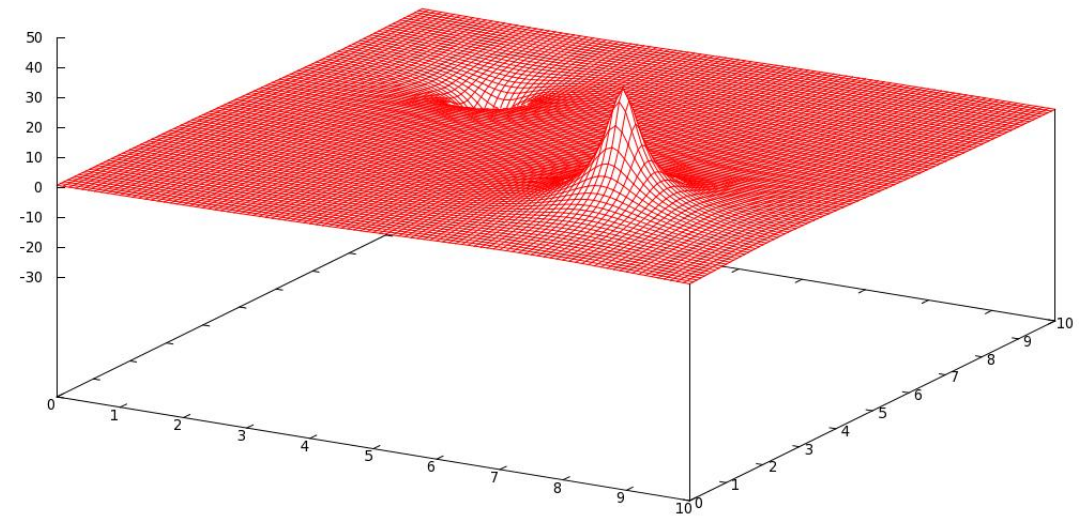
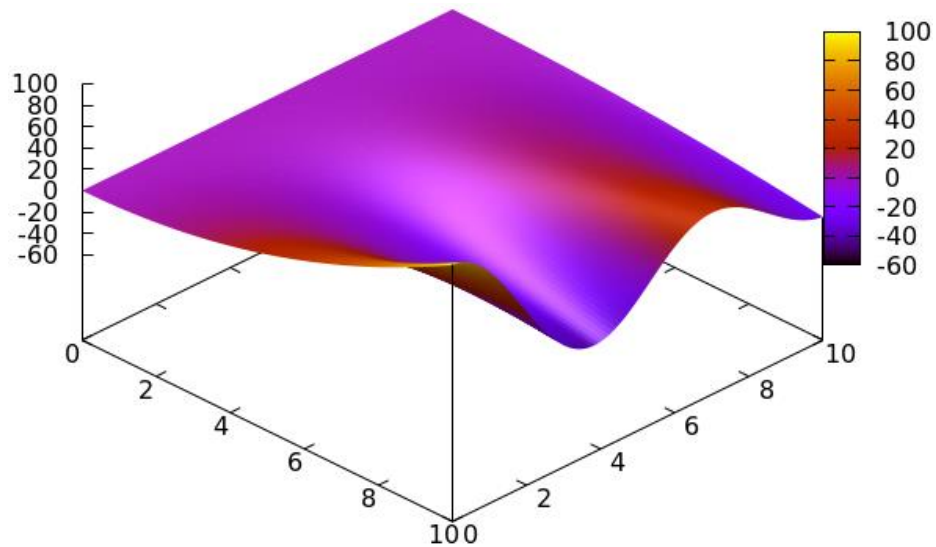
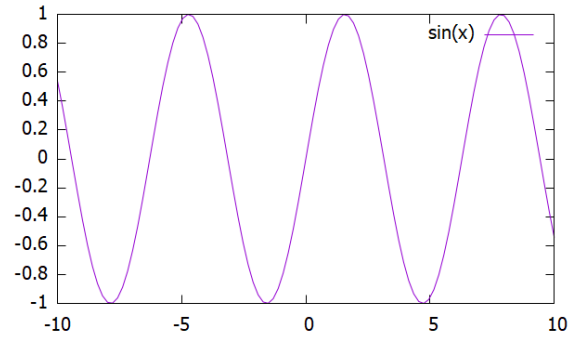
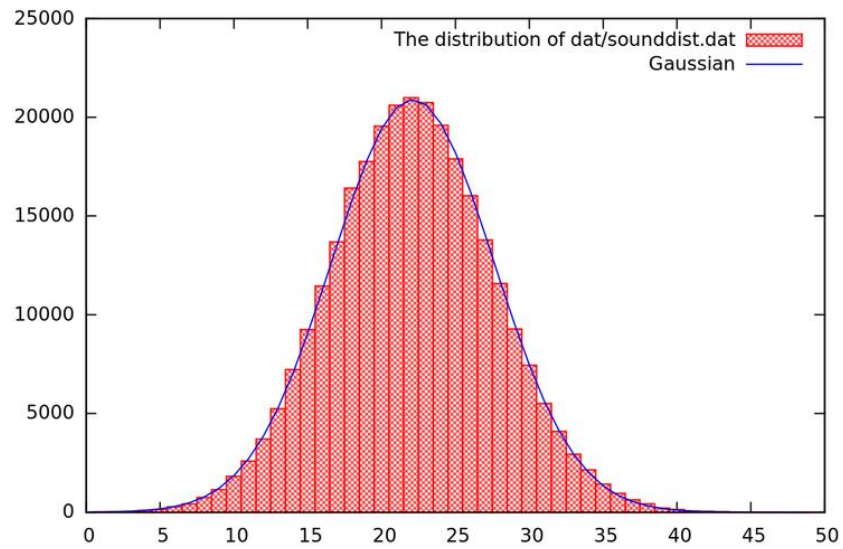
Кафедра ПКИМС

Компьютерные технологии в научных исследованиях

Семинар №6

Работа с пакетом gnuplot

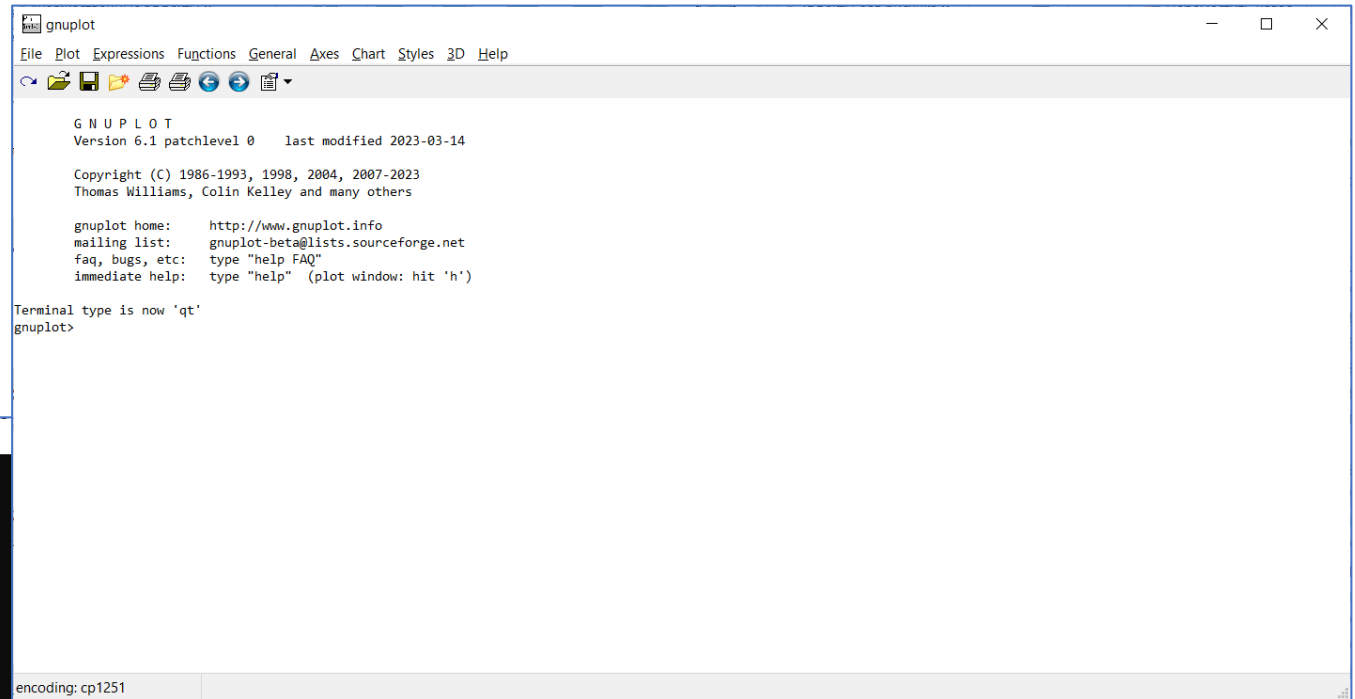
Задача визуализации графиков



Запуск программы gnuplot



wgnuplot.exe



The screenshot shows the 'wgnuplot.exe' application window. The title bar reads 'gnuplot'. The menu bar includes 'File', 'Plot', 'Expressions', 'Functions', 'General', 'Axes', 'Chart', 'Styles', '3D', and 'Help'. The toolbar contains icons for file operations and navigation. The main content area displays the following text:

```
GNU PLOT
Version 6.1 patchlevel 0 last modified 2023-03-14

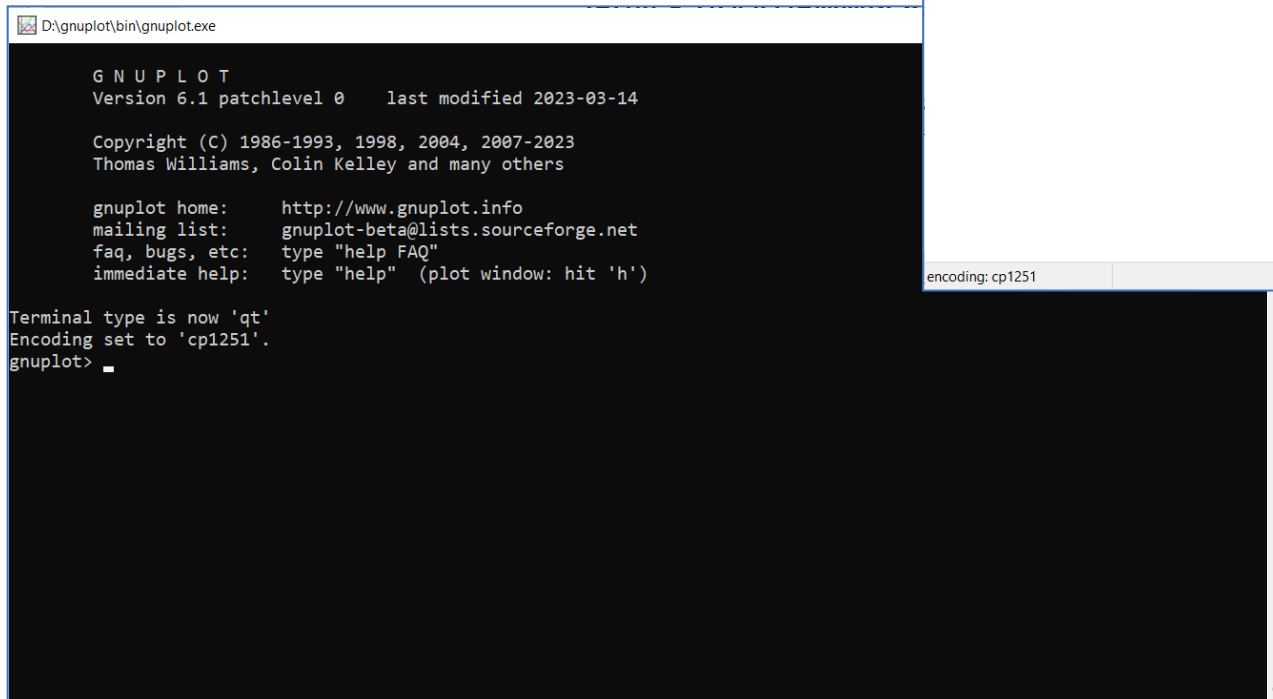
Copyright (C) 1986-1993, 1998, 2004, 2007-2023
Thomas Williams, Colin Kelley and many others

gnuplot home: http://www.gnuplot.info
mailing list: gnuplot-beta@lists.sourceforge.net
faq, bugs, etc: type "help FAQ"
immediate help: type "help" (plot window: hit 'h')
```

Below this, it says 'Terminal type is now 'qt'' and 'gnuplot>'. The status bar at the bottom indicates 'encoding: cp1251'.



gnuplot.exe



The screenshot shows the 'gnuplot.exe' application window. The title bar reads 'D:\gnuplot\bin\gnuplot.exe'. The main content area displays the following text:

```
GNU PLOT
Version 6.1 patchlevel 0 last modified 2023-03-14

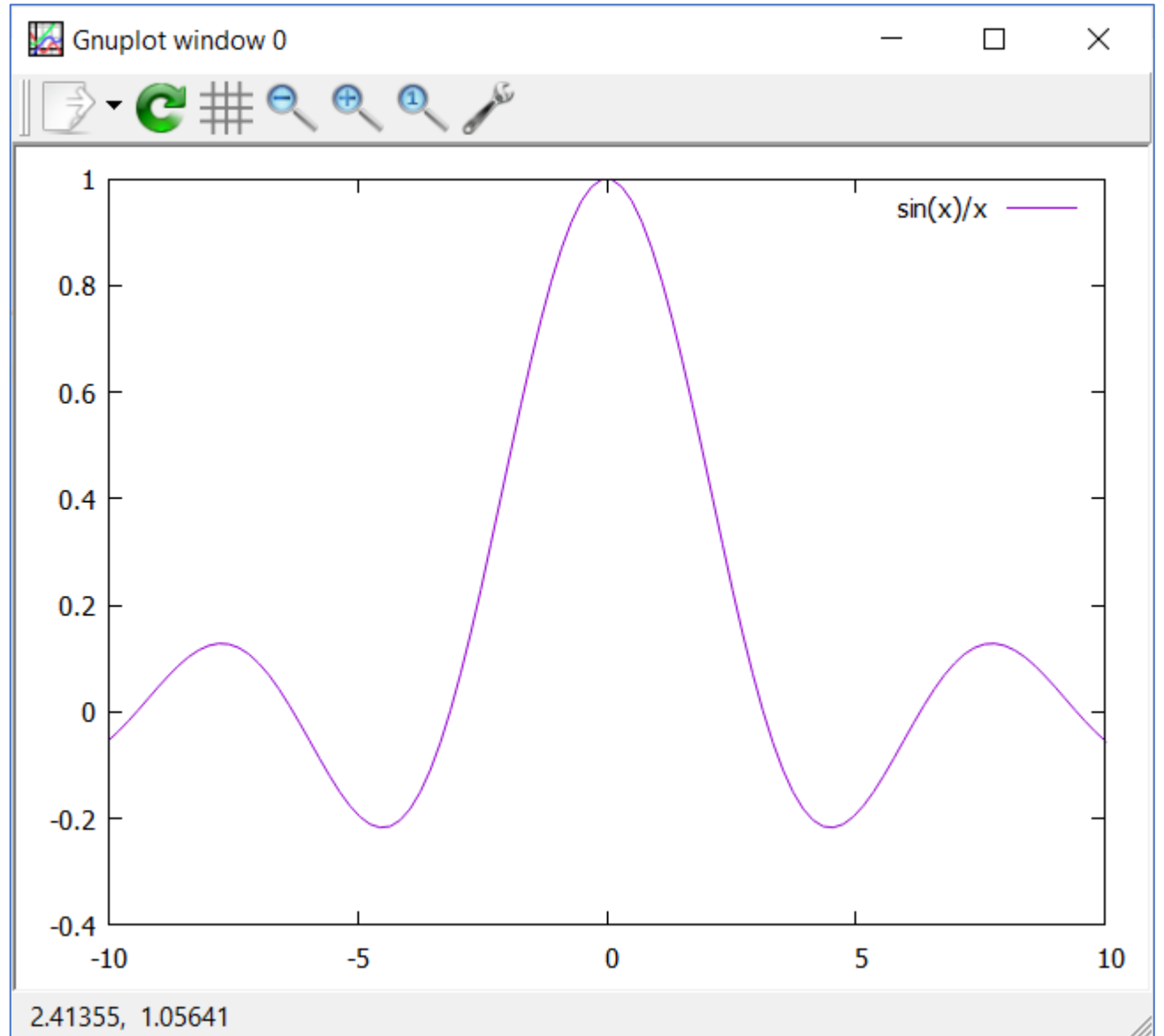
Copyright (C) 1986-1993, 1998, 2004, 2007-2023
Thomas Williams, Colin Kelley and many others

gnuplot home: http://www.gnuplot.info
mailing list: gnuplot-beta@lists.sourceforge.net
faq, bugs, etc: type "help FAQ"
immediate help: type "help" (plot window: hit 'h')
```

Below this, it says 'Terminal type is now 'qt'' and 'Encoding set to 'cp1251''. The prompt 'gnuplot>' is followed by a cursor. The status bar at the bottom indicates 'encoding: cp1251'.

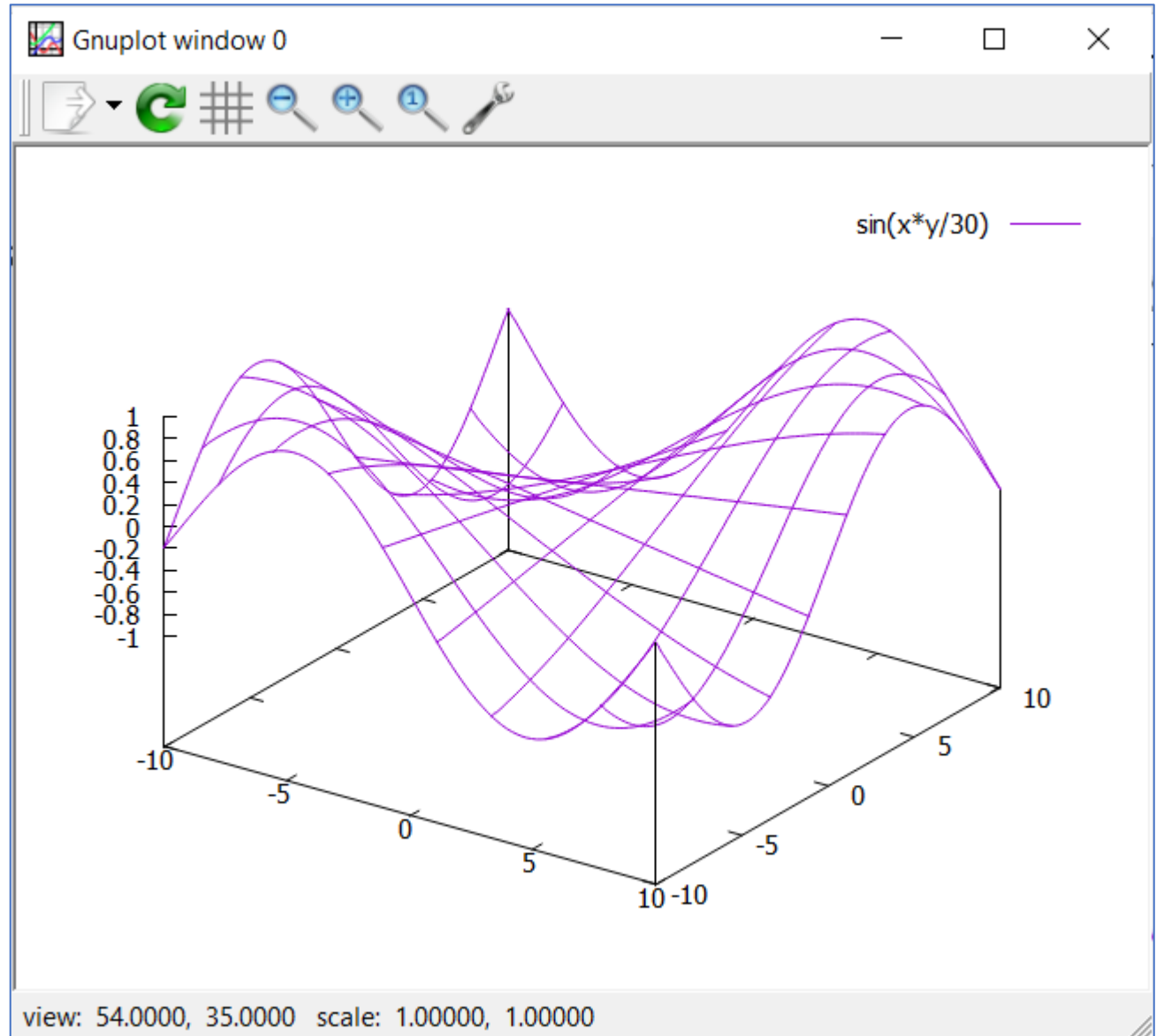
Построение простого 2D-графика

```
> plot sin(x)/x
```



Построение простого 3D-графика

```
> splot sin(x*y/30)
```



Поддерживаемые функции

<code>abs(x)</code>	absolute value of x , $ x $
<code>acos(x)</code>	arc-cosine of x
<code>asin(x)</code>	arc-sine of x
<code>atan(x)</code>	arc-tangent of x
<code>cos(x)</code>	cosine of x , x is in radians.
<code>cosh(x)</code>	hyperbolic cosine of x , x is in radians
<code>erf(x)</code>	error function of x
<code>exp(x)</code>	exponential function of x , base e
<code>inverf(x)</code>	inverse error function of x
<code>invnorm(x)</code>	inverse normal distribution of x
<code>log(x)</code>	log of x , base e
<code>log10(x)</code>	log of x , base 10
<code>norm(x)</code>	normal Gaussian distribution function
<code>rand(x)</code>	pseudo-random number generator
<code>sgn(x)</code>	1 if $x > 0$, -1 if $x < 0$, 0 if $x=0$
<code>sin(x)</code>	sine of x , x is in radians
<code>sinh(x)</code>	hyperbolic sine of x , x is in radians
<code>sqrt(x)</code>	the square root of x
<code>tan(x)</code>	tangent of x , x is in radians
<code>tanh(x)</code>	hyperbolic tangent of x , x is in radians

Управление диапазоном значений

```
> plot sin(x)/x
```

```
> plot [-5:5] sin(x)/x
```

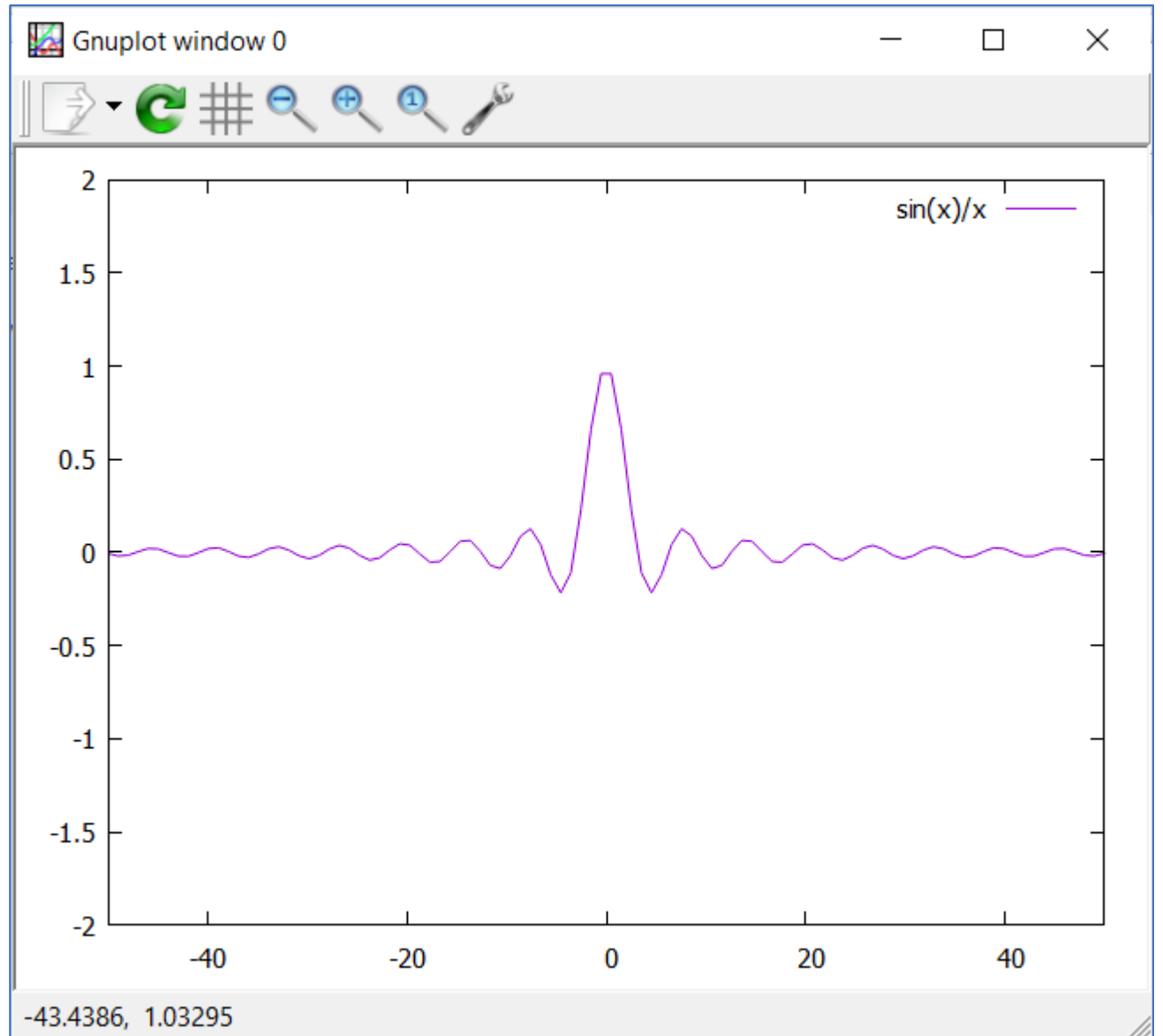
```
> plot [-5:5] [-10:10] sin(x)/x
```

```
> plot [] [-10:10] sin(x)/x
```

```
> set xrange [-50:50]
```

```
> set yrange [-2:2]
```

```
> plot sin(x)/x
```

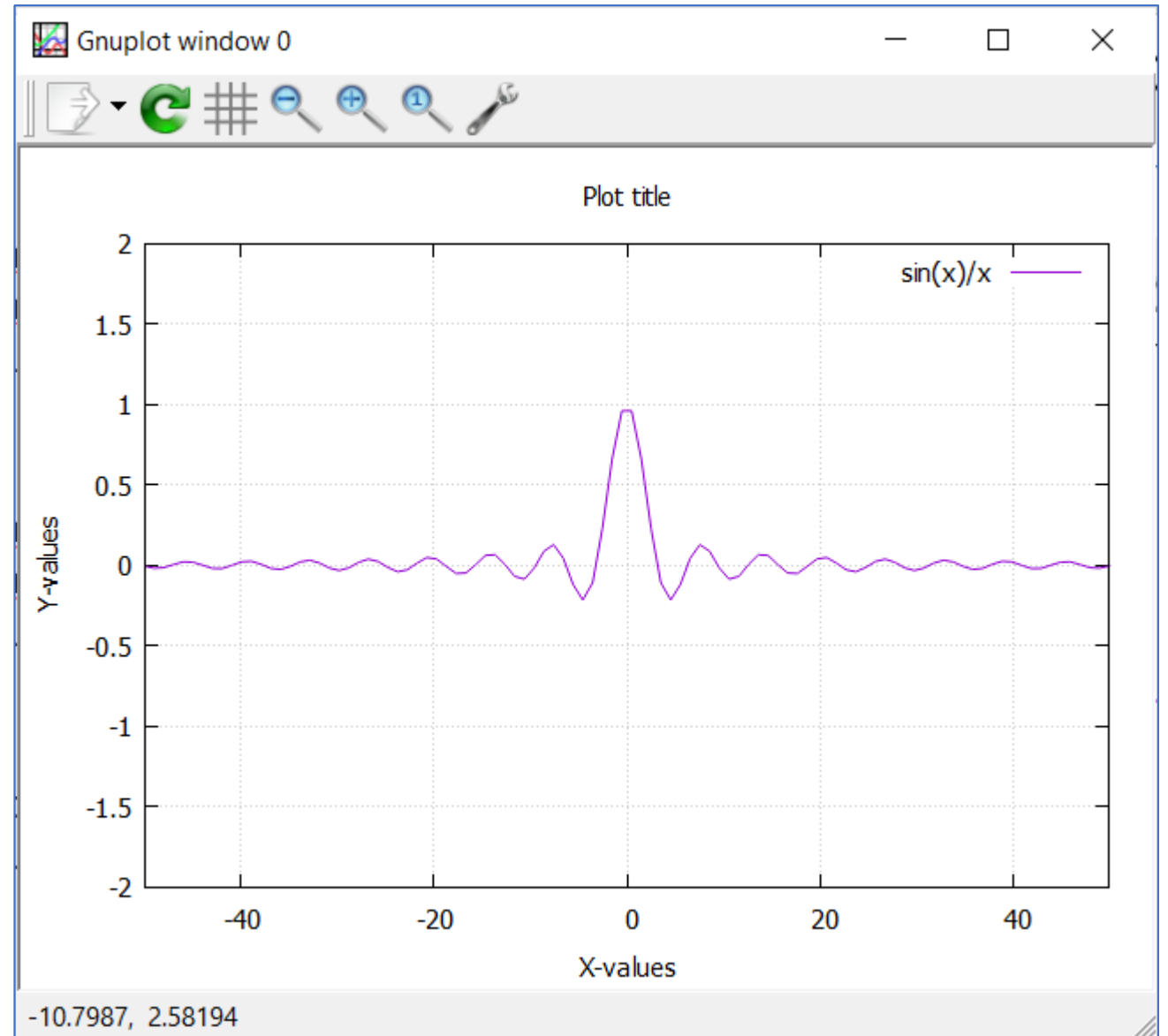


Управление текстовой информацией (1)

```
> set xrange [-50:50]  
> set yrange [-2:2]  
> plot sin(x)/x
```

```
> set xlabel "X-values"  
> set ylabel "Y-values"  
> plot sin(x)/x
```

```
> set title "Plot title"  
> plot sin(x)/x
```

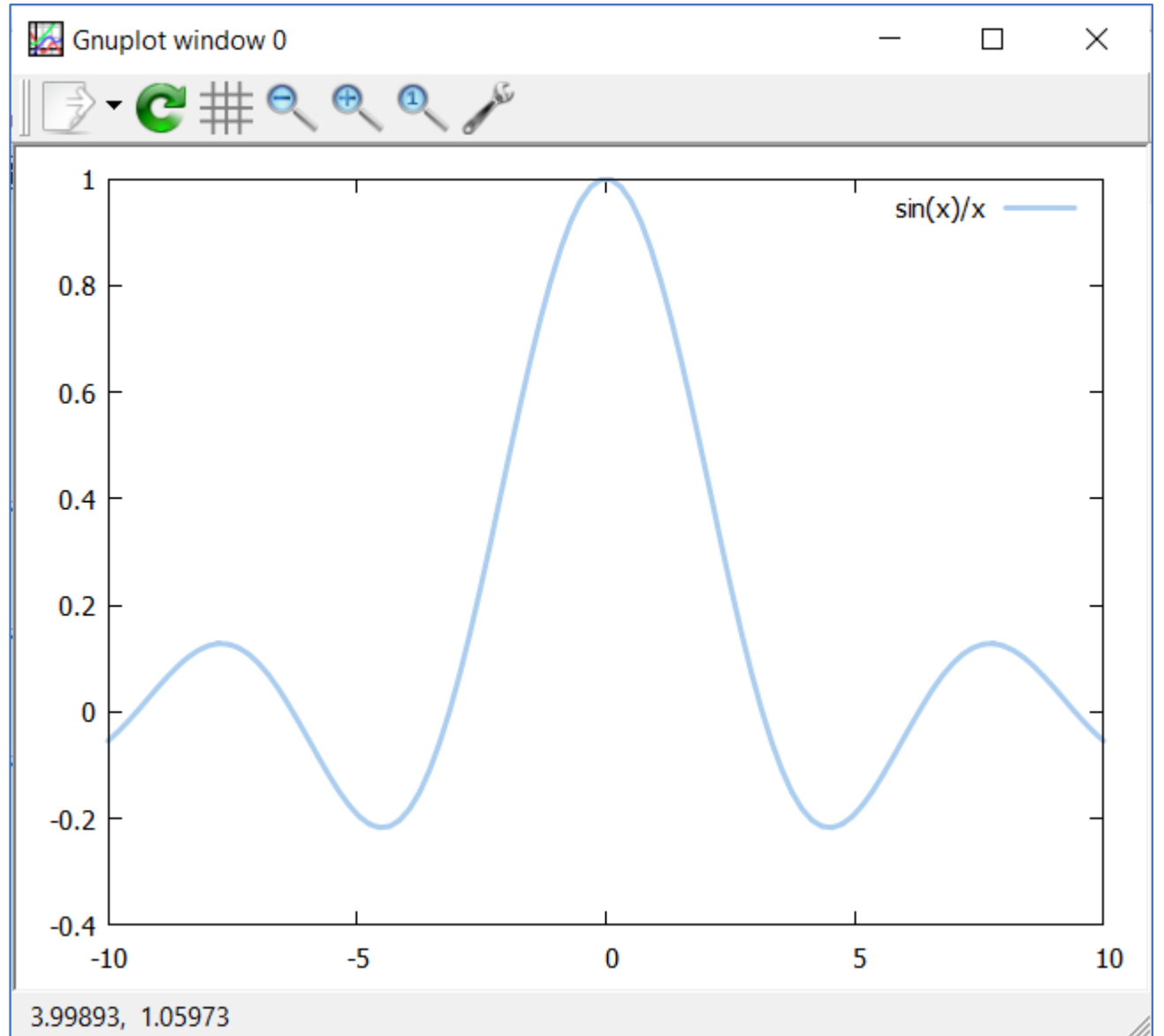


Управление внешним видом графиков (1)

```
> plot sin(x)/x
```

```
> plot sin(x)/x lt rgb "#abcdef"
```

```
> plot sin(x)/x lt rgb "#abcdef"  
lw 3
```



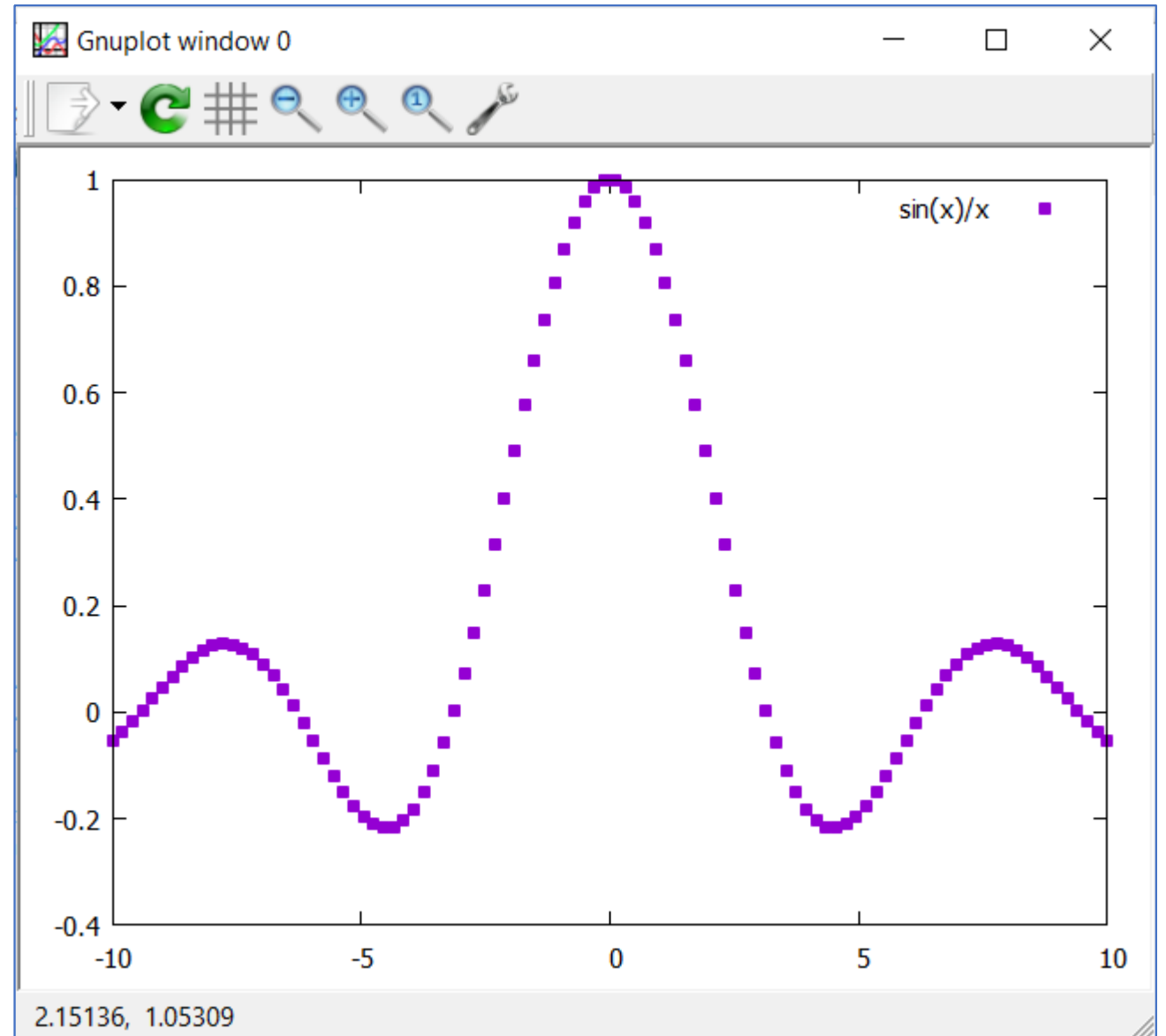
Управление внешним видом графиков (2)

> plot sin(x)/x

> plot sin(x)/x with points

> plot sin(x)/x with points
pointtype 5

1	+	16	⊖	31	●	46	■	61	◆
2	×	17	⊙	32	□	47	■	62	◆
3	✖	18	⊗	33	▣	48	◇	63	◆
4	□	19	⊕	34	▣	49	◇	64	□
5	■	20	⊗	35	▣	50	◇	65	○
6	○	21	⊕	36	▣	51	◇	66	△
7	●	22	⊗	37	▣	52	◇	67	▽
8	△	23	⊕	38	▣	53	◇	68	◇
9	▲	24	⊗	39	▣	54	◇	69	○
10	▽	25	⊕	40	▣	55	◇	70	□
11	▼	26	⊗	41	▣	56	◇	71	○
12	◇	27	⊕	42	▣	57	◇	72	△
13	◆	28	⊗	43	▣	58	◇	73	▽
14	○	29	⊕	44	▣	59	◇	74	◇
15	●	30	⊗	45	▣	60	◇	75	○



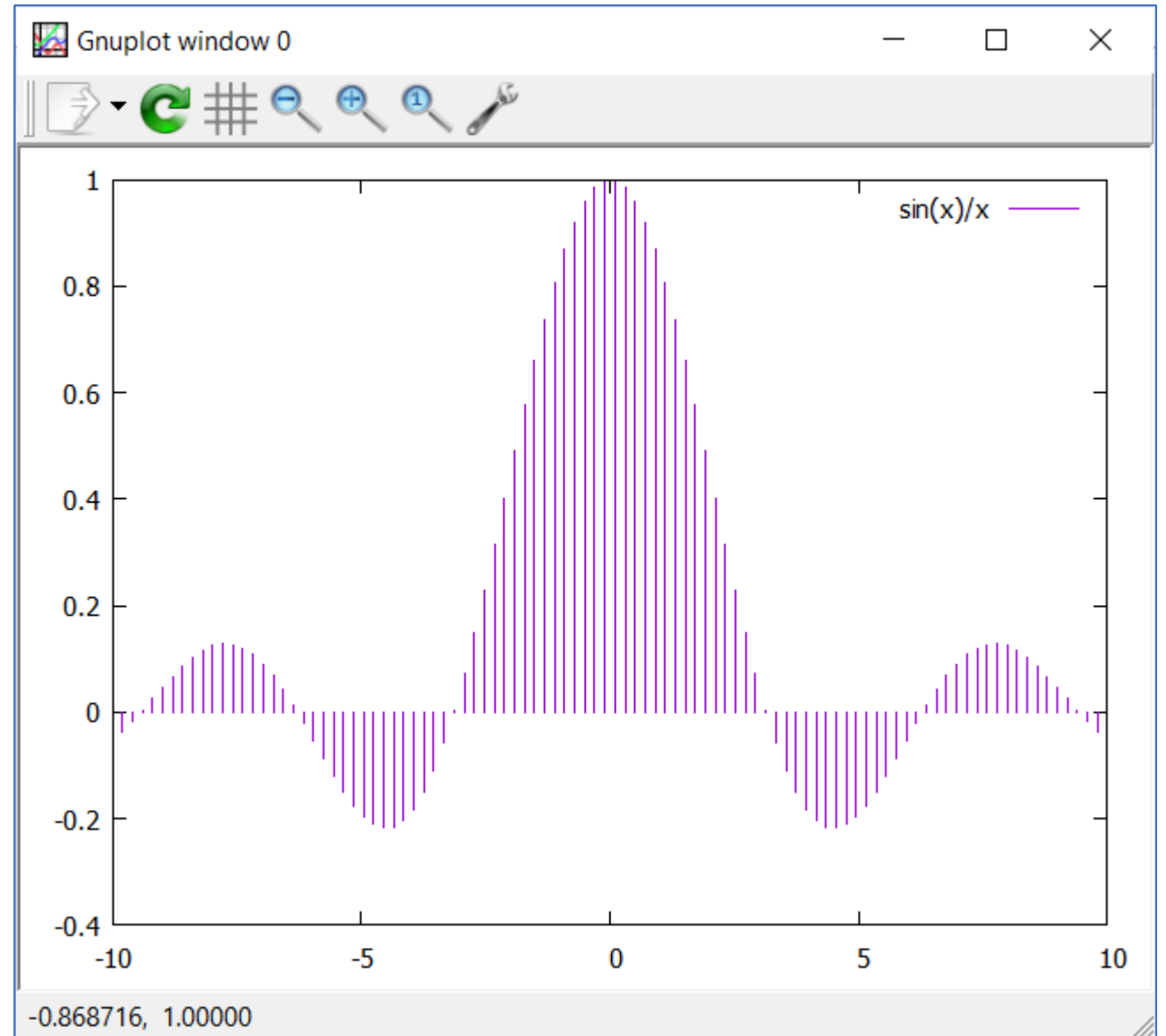
Управление внешним видом графиков (4)

> plot sin(x)/x with points

> plot sin(x)/x with lines

> plot sin(x)/x with dots

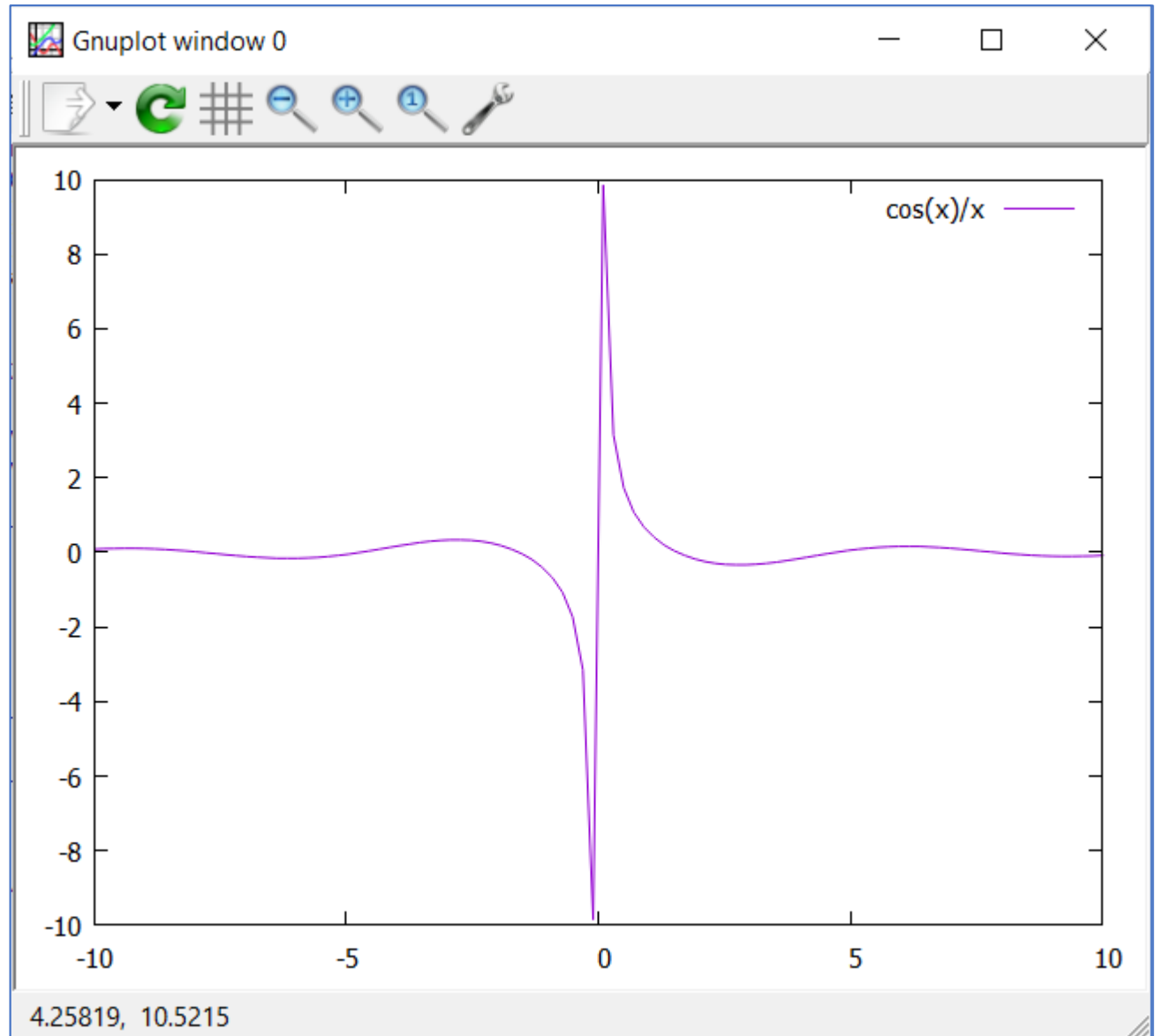
> plot sin(x)/x with impulses



Рисование нескольких графиков (1)

```
> plot sin(x)/x
```

```
> plot cos(x)/x
```

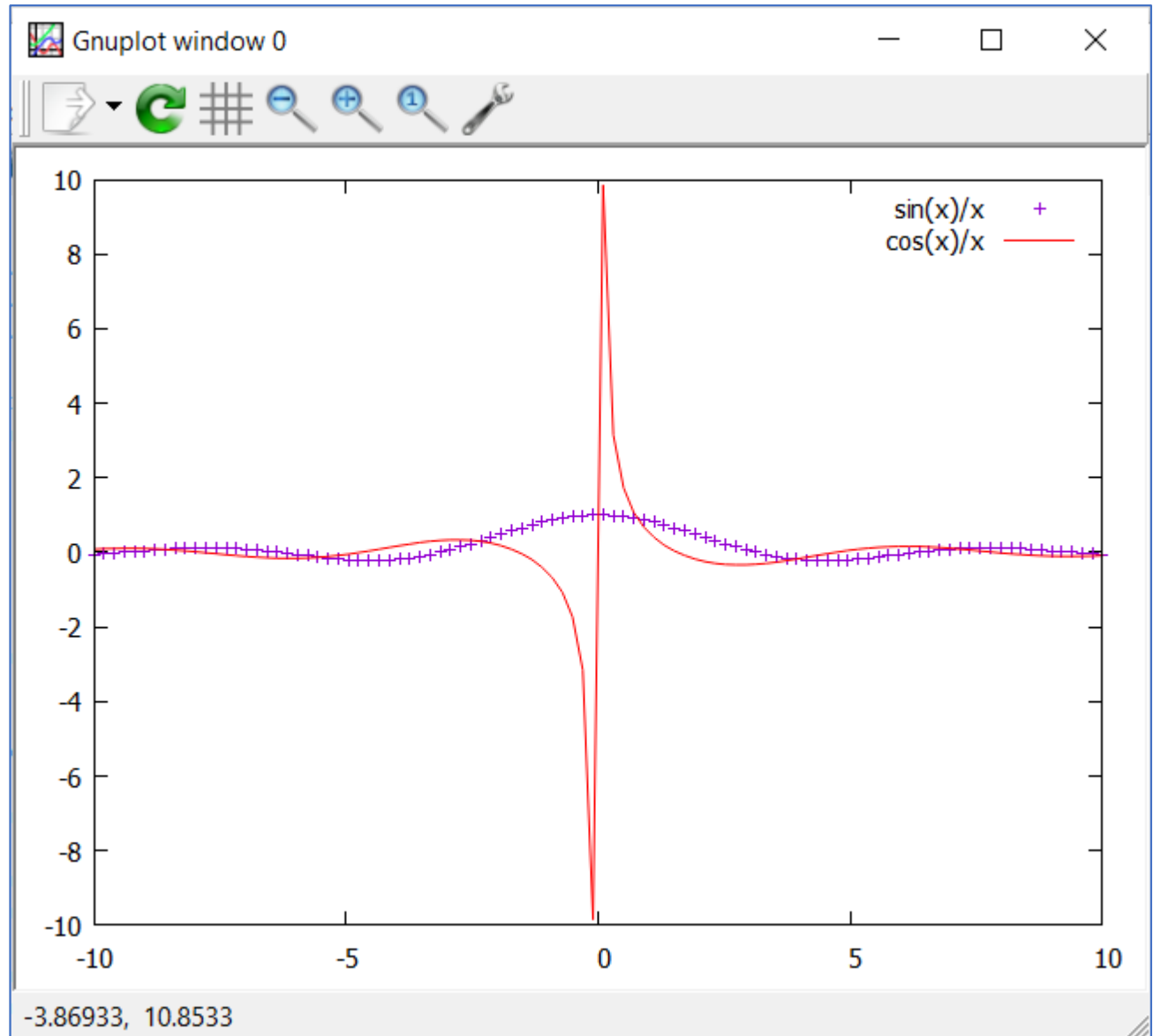


Рисование нескольких графиков (2)

> plot sin(x)/x, cos(x)/x

> plot sin(x)/x with points,
cos(x)/x

> plot sin(x)/x with points,
cos(x)/x lt rgb "#ff0000"



Визуализация данных из файлов

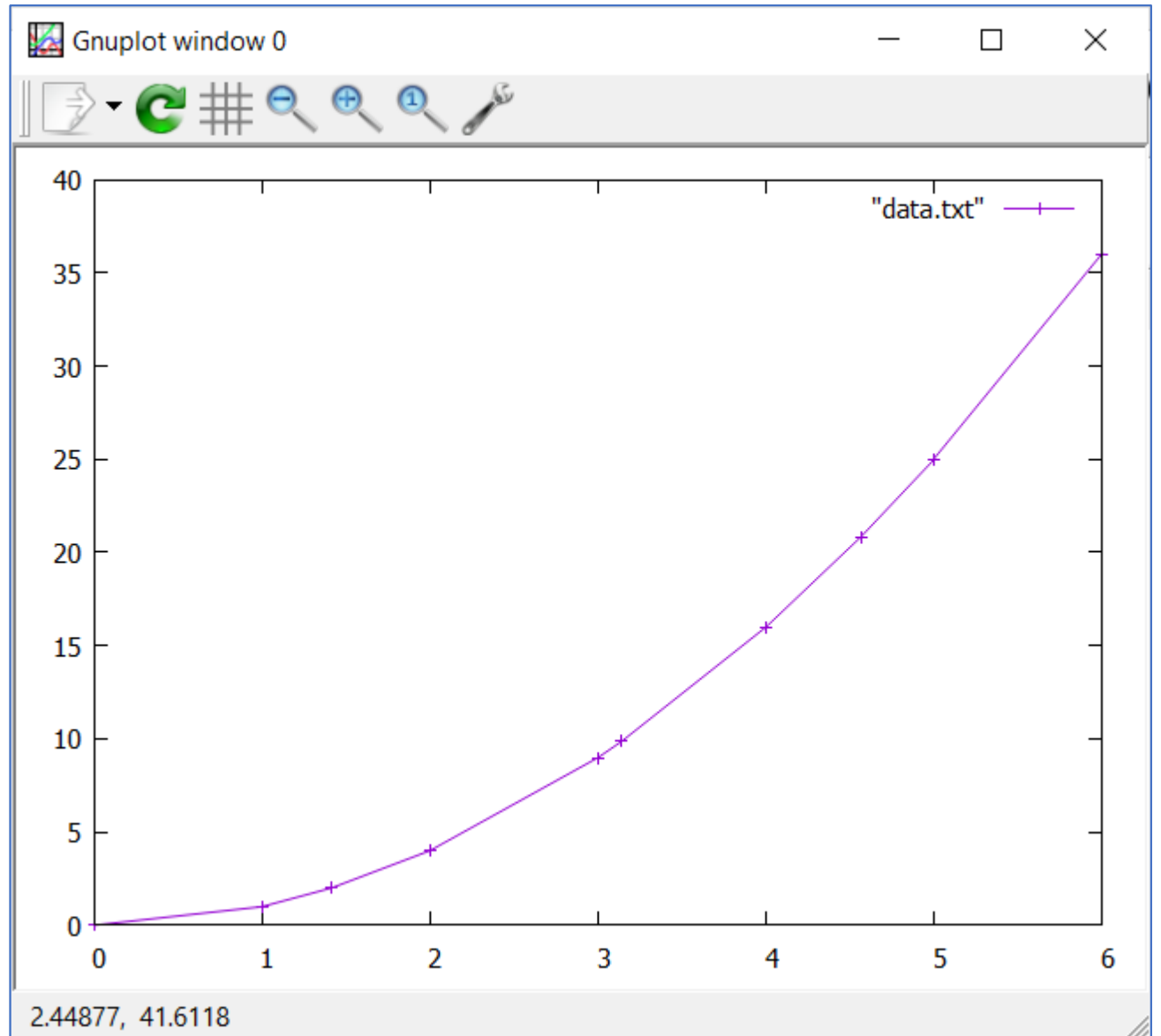
Файл data.txt

0	0	0	5
1	1	2	15
1.4142	2	2.8284	1
2	4	4	30
3	9	6	26.46
3.1415	9.8696	6.2832	39.11
4	16	8	20
4.5627	20.8182	9.1254	17
5.0	25.0	10.0	25.50
6	36	12	0.908

> plot "data.txt"

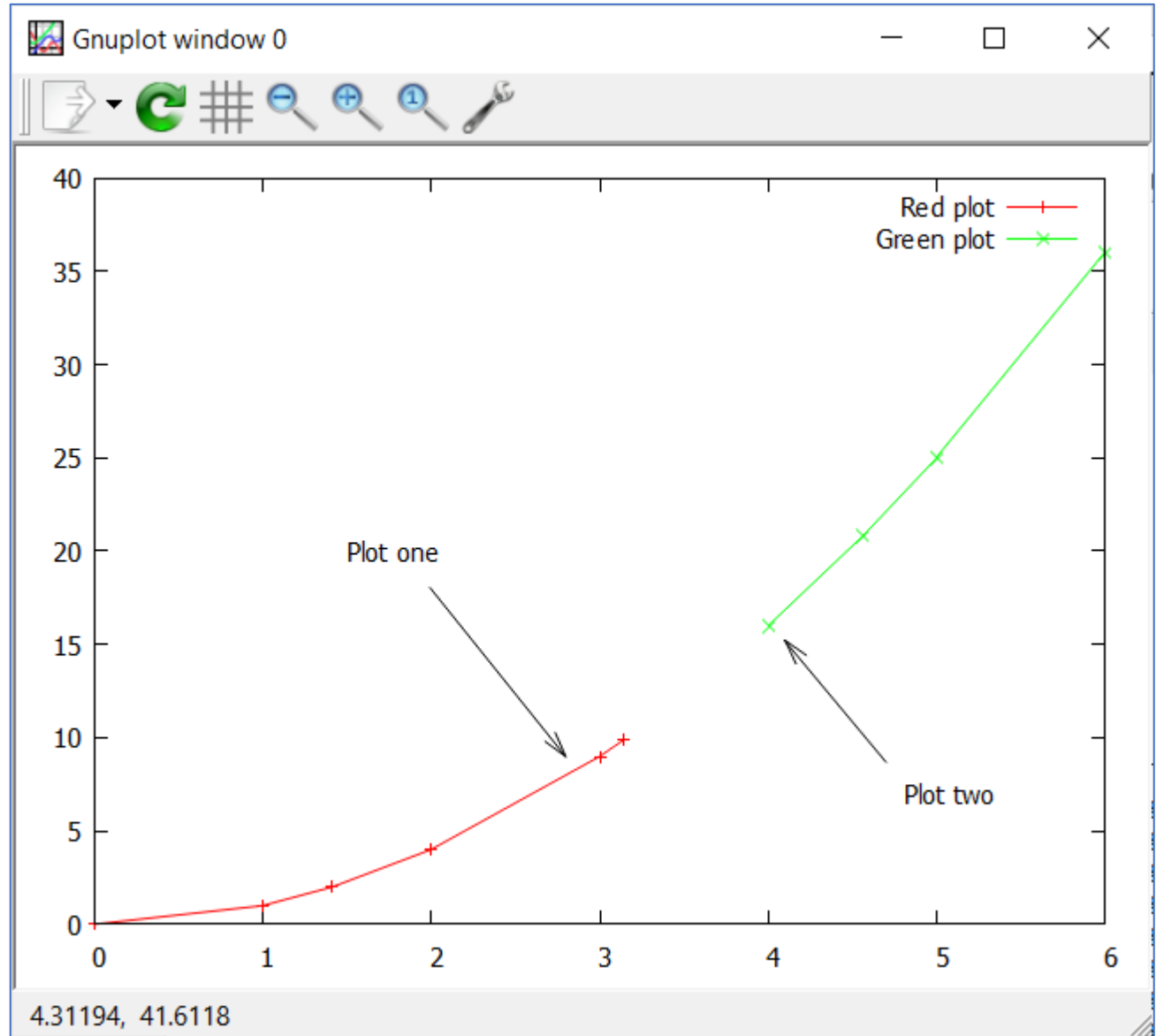
> plot "data.txt" with lines

> plot "data.txt" with linespoints



Добавление элементов на график (2)

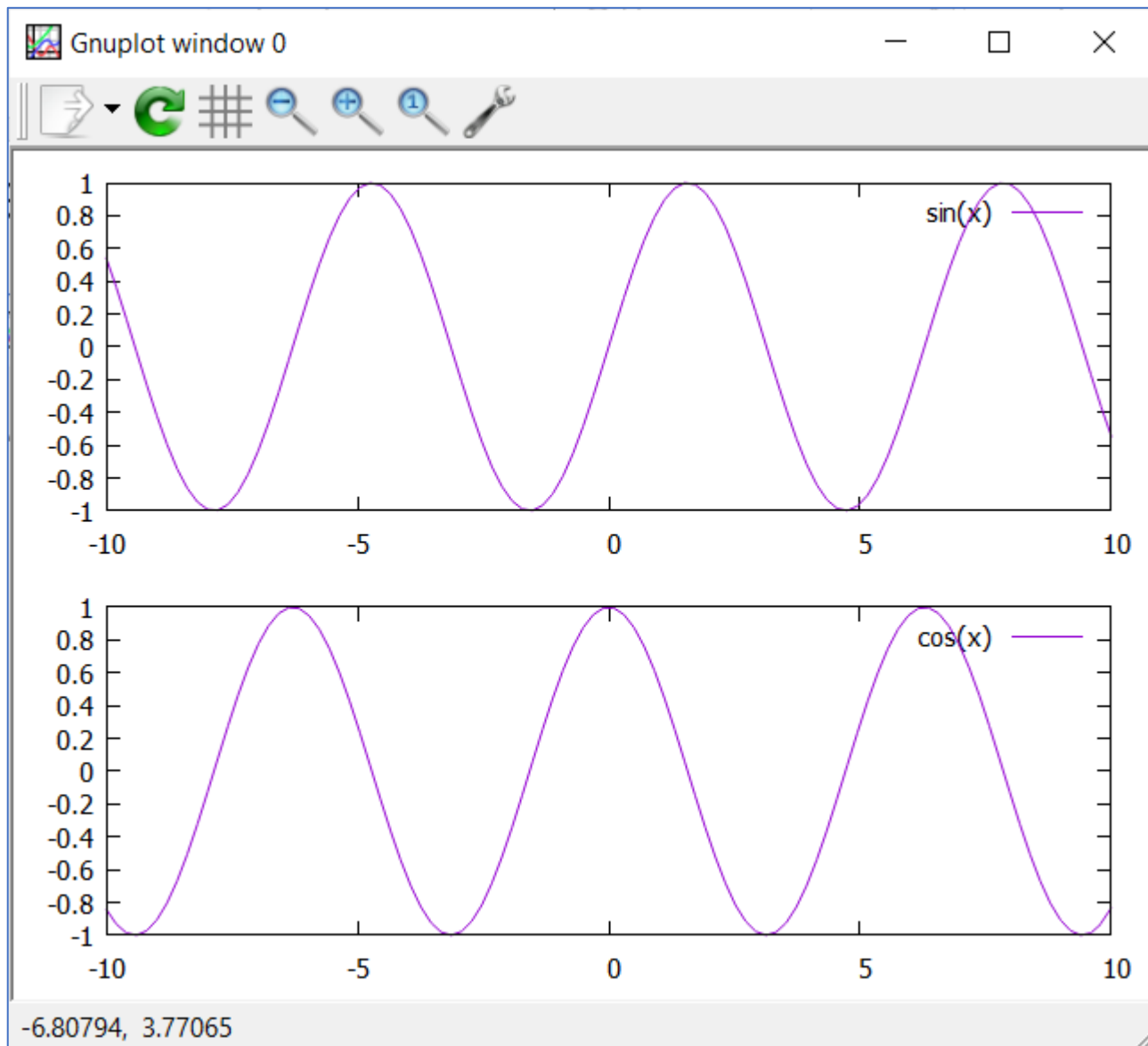
```
> plot "data.txt" index 0  
  with linespoint  
  lt rgb "red"  
  title "Red plot",  
  "" index 1  
  with linespoint  
  lt rgb "green"  
  title "Green plot"  
  
> set arrow from <Coold1> to <Coord2>  
> replot
```



Несколько отдельных графиков

```
> set multiplot
> set size 1,0.5
> set origin 0.0,0.5
> plot sin(x)
> set origin 0.0,0.0
> plot cos(x)
> unset multiplot
```

```
gnuplot> reset
gnuplot> set multiplot
multiplot> set size 1,0.5
multiplot> set origin 0.0,0.5
multiplot> plot sin(x)
multiplot> set origin 0.0,0.0
multiplot> plot cos(x)
multiplot> unset multiplot
gnuplot> _
```



Визуализация поля данных (1)

```
> splot 'test_35_03.txt' matrix
```

