

Tests for pgfplots.sty

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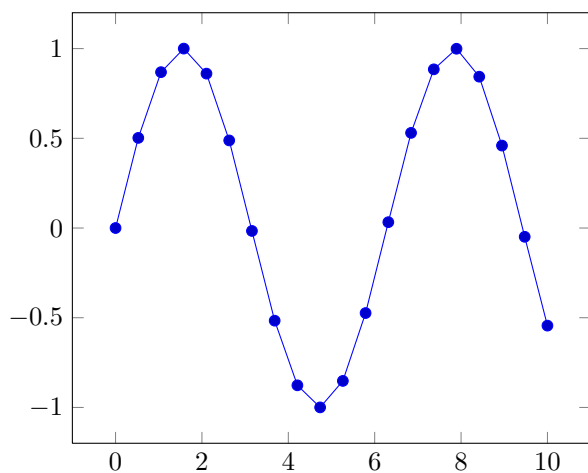
Chapter 1

pgfplotstest.file.tex

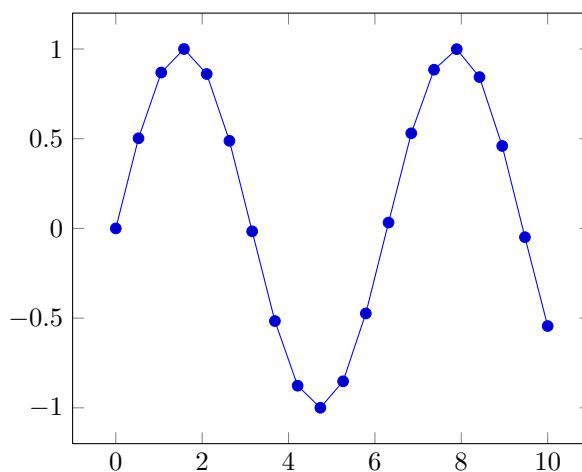
1.1 ‘plot file’ test

1.1.1 A file in gnuplot format ‘num num i’

```
1 #Curve_0_of_1,_20_points
2 #x,y_type
3 0.00000_0.00000_ii
4 0.52632_0.50235_ii
5 1.05263_0.86873_ii
6 1.57895_0.99997_ii
7 2.10526_0.86054_ii
8 2.63158_0.48819_ii
9 3.15789_-0.01630_ii
10 3.68421_-0.51638_ii
11 4.21053_-0.87669_ii
12 4.73684_-0.99970_ii
13 5.26316_-0.85212_ii
14 5.78947_-0.47390_ii
15 6.31579_0.03260_ii
16 6.84211_0.53027_ii
17 7.36842_0.88441_ii
18 7.89474_0.99917_ii
19 8.42105_0.84348_ii
20 8.94737_0.45948_ii
21 9.47368_-0.04889_ii
22 10.00000_-0.54402_ii
```

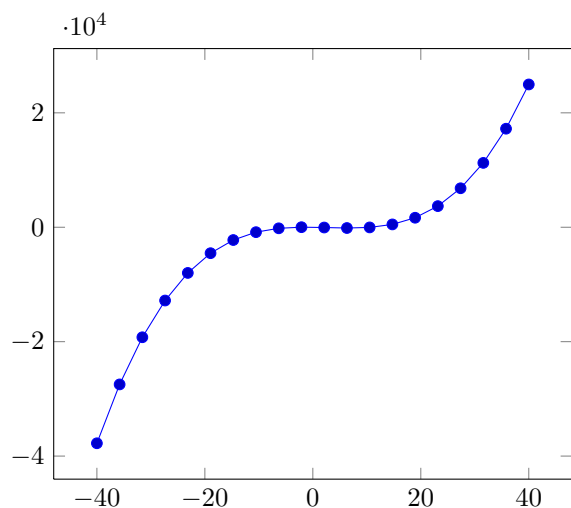


Same file loaded with ‘plot table’



1.1.2 A file which differs slightly from gnuplot format

```
1 #Curve_0_of_1,_20_points
2 #.5***3_-4***2_-16***1
3 #x,y_type
4 -40.00000_-37760.00000_ii
5 -35.78947_-27472.03966_ii
6 -31.57895_-19229.39204_ii
7 -27.36842_-12808.11780_ii
8 -23.15789_-7984.27759_ii
9 -18.94737_-4533.93206_ii
10 -14.73684_-2233.14186_ii
11 -10.52632_-857.96763_ii
12 -6.31579_-184.47004_ii
13 -2.10526_11.29028_ii
14 2.10526_-46.74734_ii
15 6.31579_-134.64353_ii
16 10.52632_-28.45896_ii
17 14.73684_495.74574_ii
18 18.94737_1661.90990_ii
19 23.15789_3693.97288_ii
20 27.36842_6815.87403_ii
21 31.57895_11251.55270_ii
22 35.78947_17224.94824_ii
23 40.00000_24960.00000_ii
```

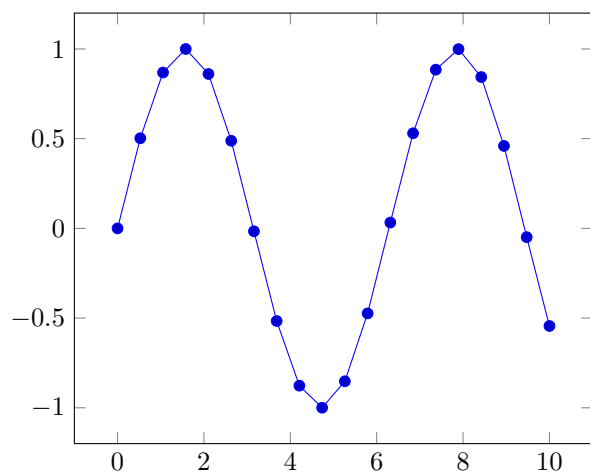


1.1.3 A file which starts with newlines

```

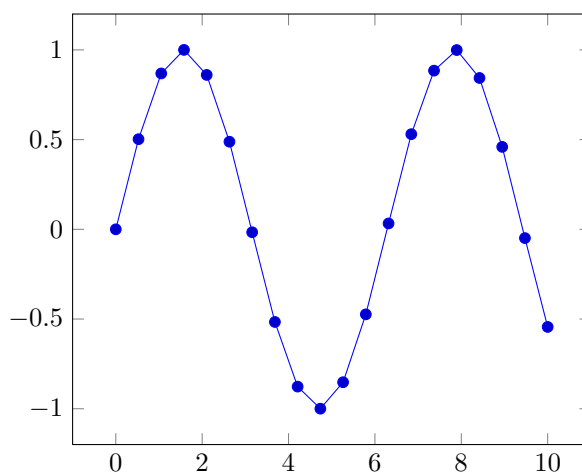
1
2 #Curve_0_of_1,_20_points
3 #x_y_type
4 0.00000_0.00000_i
5 0.52632_0.50235_i
6 1.05263_0.86873_i
7 1.57895_0.99997_i
8 2.10526_0.86054_i
9 2.63158_0.48819_i
10 3.15789_-0.01630_i
11 3.68421_-0.51638_i
12 4.21053_-0.87669_i
13 4.73684_-0.99970_i
14 5.26316_-0.85212_i
15 5.78947_-0.47390_i
16 6.31579_0.03260_i
17 6.84211_0.53027_i
18 7.36842_0.88441_i
19 7.89474_0.99917_i
20 8.42105_0.84348_i
21 8.94737_0.45948_i
22 9.47368_-0.04889_i
23 10.00000_-0.54402_i

```

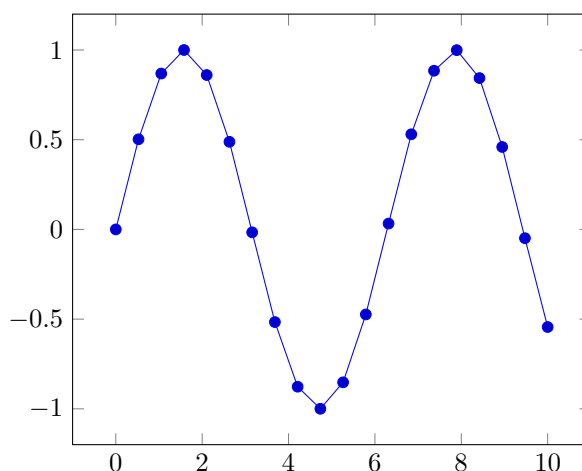


Same file loaded with 'plot table'

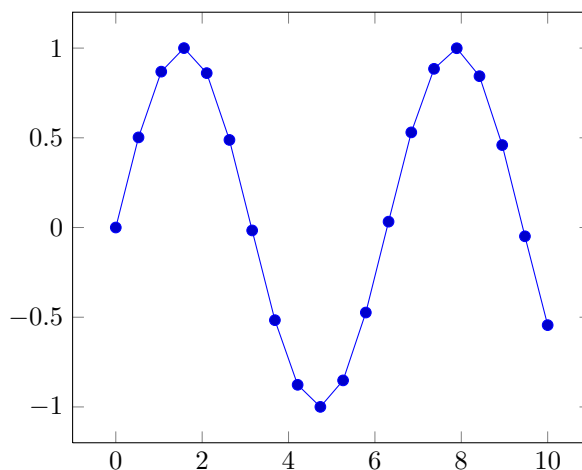
The first data point should have been identified as column name.



Same file loaded with 'plot table from macro'

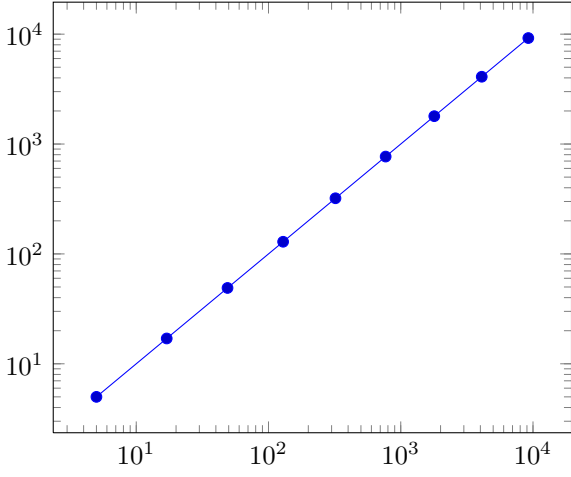


testing space gobbling in 'plot file' command



testing plot file ‘skip first’ option to skip header

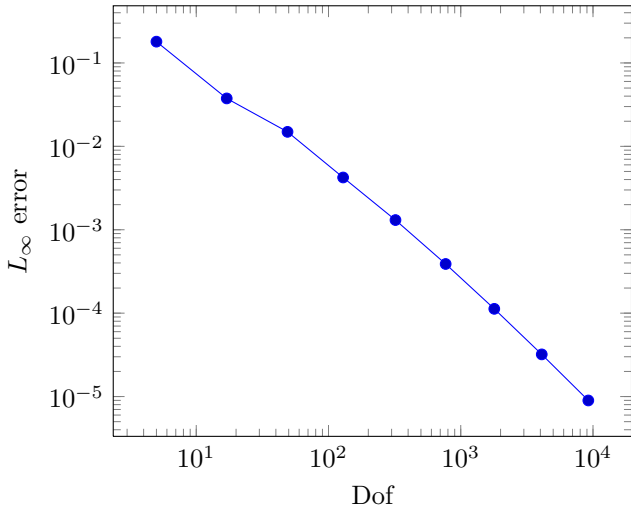
Read from file ‘pgfplotstest_plot’



1.2 ‘plot table’ test

1.2.1 Plot by column ‘dof’ versus column ‘Lmax’

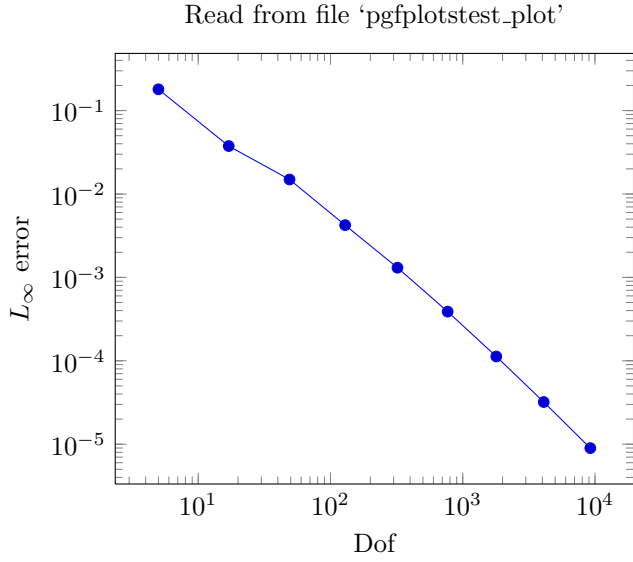
Read from file ‘pgfplotstest_plot’



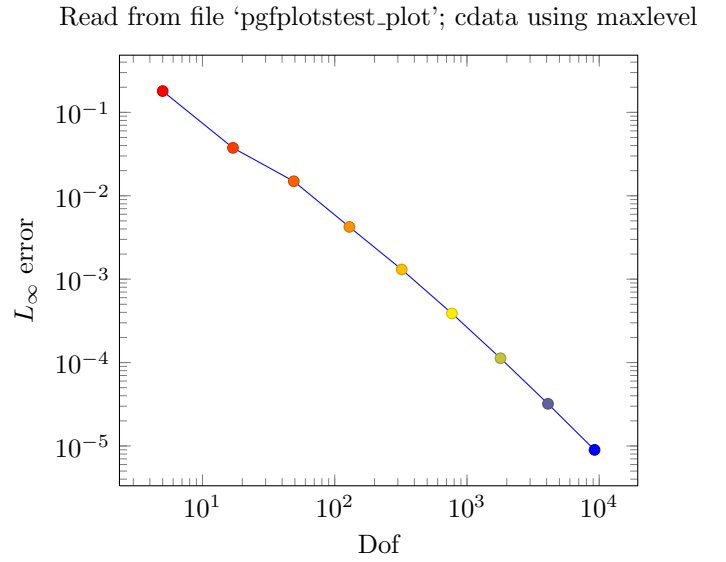
1	G	Basis	dof	I2	I2_abserror	A	Imax	Imax_releerror	cgiter	cgiter_err	maxlevel	eps
2	\$flags_int	int	int	int	sci:8	sci:8	sci:8	int	sci:8	int	std:8	
3	5	5	5	8.31160034e-02	1e-2	0.00000000e+00	1.80007647e-01	0.0	0.2	1	2	-1
4	17	17	17	2.54685628e-02	0	0.00000000e+00	3.75580565e-02	0.7	5	1	3	-1
5	49	49	49	7.40715288e-03	5e-3	0.00000000e+00	1.49212716e-02	0.5	11	2	4	-1
6	129	129	129	2.10192154e-03	1e-1	0.00000000e+00	4.23330523e-03	0.9	26	3	5	-1
7	321	321	321	5.87352989e-04	0	0.00000000e+00	1.30668515e-03	0.2	43	3	6	-1
8	769	769	769	1.62269942e-04	1e-4	0.00000000e+00	3.88658098e-04	0.25	49	2	7	-1
9	1793	1793	1793	4.44248889e-05	1e-5	0.00000000e+00	1.12651668e-04	0.4	52	0	8	-1
10	4097	4097	4097	1.20714122e-05	0.5e-5	0.00000000e+00	3.20339285e-05	0.3	56	4	9	-1
11	9217	9217	9217	3.26101452e-06	0.7e-6	0.00000000e+00	8.97617707e-06	0.5	59	3	10	-1

Table 1.1: pgfplotstest_plot

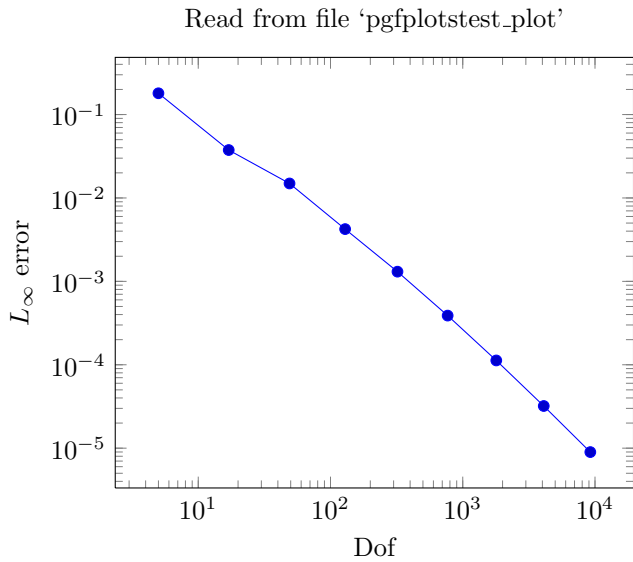
1.2.2 Plot by column 'dof' versus column 'LmaxXX', a col alias



1.2.4 Plot by column 'dof' versus column 'L/m=ax', a col alias



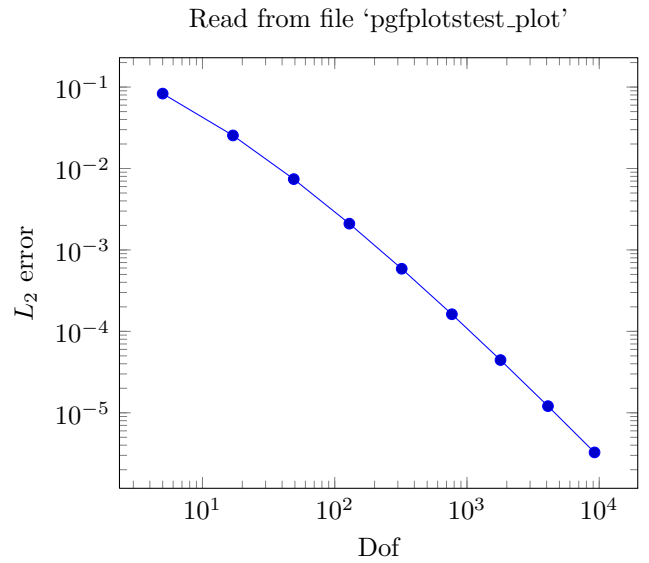
1.2.3 Plot by column 'dof' versus column 'L/m=ax', a col alias



1.2.5 showing the plot data with both, 'create on use' and col alias

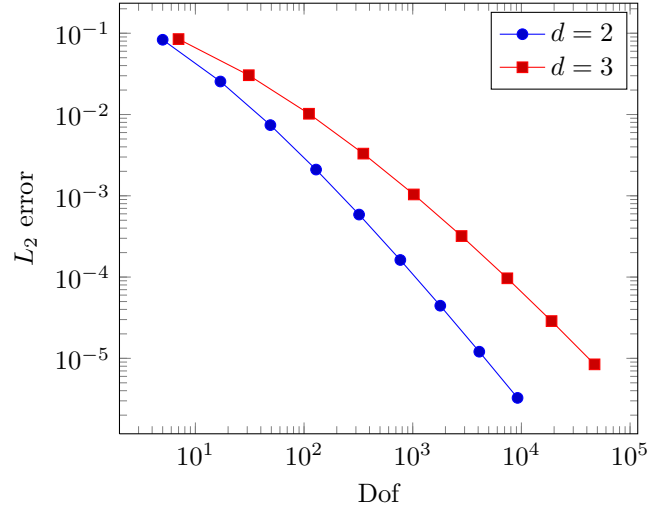
dof	L/m=ax	order
5	0.18	
17	$3.76 \cdot 10^{-2}$	2.26
49	$1.49 \cdot 10^{-2}$	1.33
129	$4.23 \cdot 10^{-3}$	1.82
321	$1.31 \cdot 10^{-3}$	1.7
769	$3.89 \cdot 10^{-4}$	1.75
1,793	$1.13 \cdot 10^{-4}$	1.79
4,097	$3.2 \cdot 10^{-5}$	1.81
9,217	$8.98 \cdot 10^{-6}$	1.84

1.2.6 Plot by column #2 versus column #3



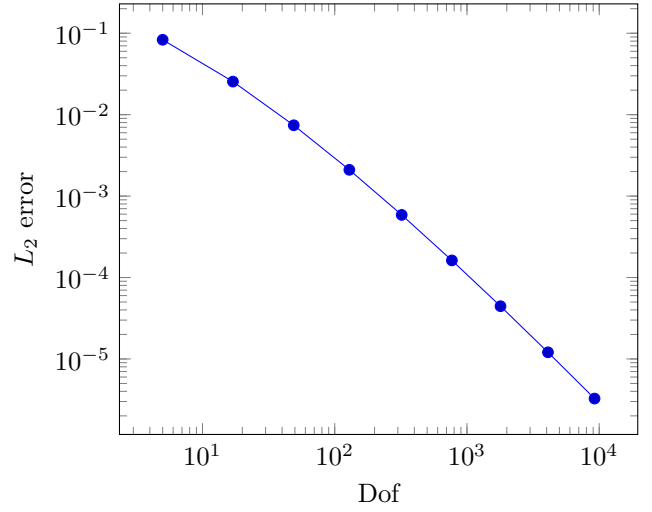
1.2.7 Plot by preloaded tables

Read from file 'pgfplotstest_plot' and 'pgfplotstest_plot3'



1.2.8 a table which has no column names

Read from file 'pgfplotstest_plotnocolnames'



1	G	Basis	dof	L2	A	Lmax	cgiter	maxlevel	eps
2	\$flags_int	int	int	int	sci:8	sci:8	int	int	std:8
3	7	7	7	8.47178381e-02	0.00000000e+00	2.40709867e-01	2	2	2
4	31	31	31	3.04409349e-02	0.00000000e+00	7.83790314e-02	5	3	3
5	111	111	111	1.02214539e-02	0.00000000e+00	3.08129583e-02	12	4	4
6	351	351	351	3.30346265e-03	0.00000000e+00	1.04183980e-02	29	5	5
7	1023	1023	1023	1.03886535e-03	0.00000000e+00	3.27014492e-03	46	6	6
8	2815	2815	2815	3.19646457e-04	0.00000000e+00	9.82705632e-04	53	7	7
9	7423	7423	7423	9.65789766e-05	0.00000000e+00	2.98443097e-04	57	8	8
10	18943	18943	18943	2.87339125e-05	0.00000000e+00	8.86501125e-05	62	9	9
11	47103	47103	47103	8.43749881e-06	0.00000000e+00	2.62313540e-05	66	10	10

Table 1.2: pgfplotstest_plot3

1	5	5	5	8.31160034e-02	0.00000000e+00	1.80007647e-01	2	2	-1
2	17	17	17	2.54685628e-02	0.00000000e+00	3.75580565e-02	5	3	-1
3	49	49	49	7.40715288e-03	0.00000000e+00	1.49212716e-02	11	4	-1
4	129	129	129	2.10192154e-03	0.00000000e+00	4.23330523e-03	26	5	-1
5	321	321	321	5.87352989e-04	0.00000000e+00	1.30668515e-03	43	6	-1
6	769	769	769	1.62269942e-04	0.00000000e+00	3.88658098e-04	49	7	-1
7	1793	1793	1793	4.44248889e-05	0.00000000e+00	1.12651668e-04	52	8	-1
8	4097	4097	4097	1.20714122e-05	0.00000000e+00	3.20339285e-05	56	9	-1
9	9217	9217	9217	3.26101452e-06	0.00000000e+00	8.97617707e-06	59	10	-1

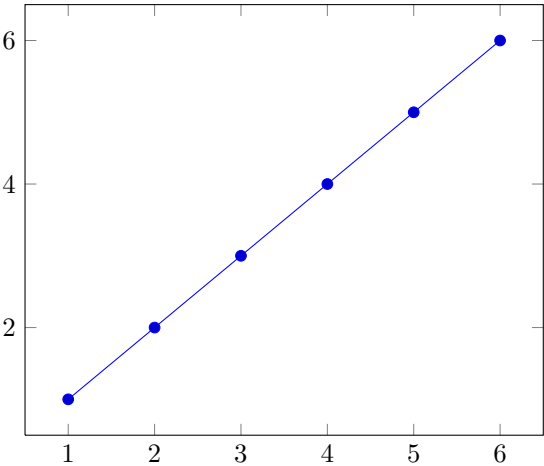
Table 1.3: plotdata/pgfplotstest-plotnocolnames

1.3 Table Column Separators

```
1 x,something,y
2 1,42,1
3 2,234,2
4 3,234,3
5 4,234,4
6 5,2342,5
7 6,32423,6
```

x	something	y
1	42	1
2	234	2
3	234	3
4	234	4
5	2,342	5
6	32,423	6

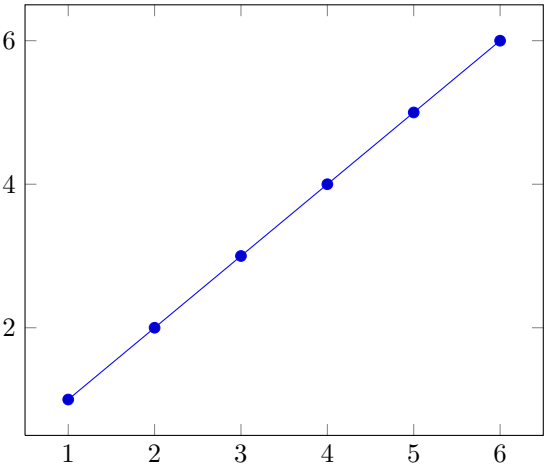
col sep=comma.



```
1 x;something;y
2 1;42;1
3 2;234;2
4 3;234;3
5 4;234;4
6 5;2342;5
7 6;32423;6
```

x	something	y
1	42	1
2	234	2
3	234	3
4	234	4
5	2,342	5
6	32,423	6

col sep=semicolon.

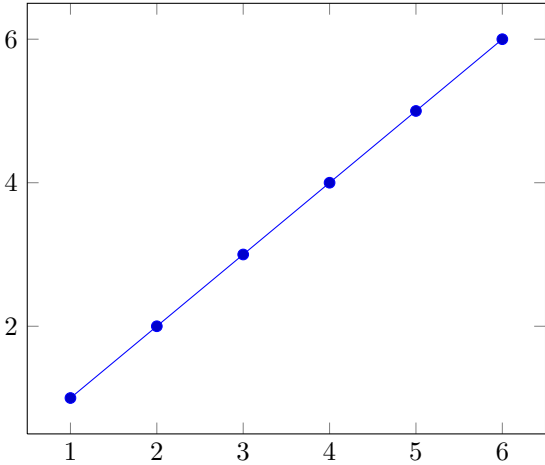


```
1 x:something:y
2 1:42:1
3 2:234:2
```

```
4 3:234:3
5 4:234:4
6 5:2342:5
7 6:32423:6
```

x	something	y
1	42	1
2	234	2
3	234	3
4	234	4
5	2,342	5
6	32,423	6

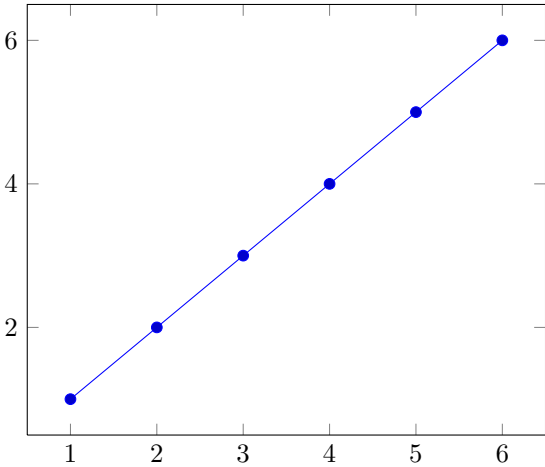
col sep=colon.



```
1 {x}{something}{y}
2 {1}{42}{1}
3 {2}{234}{2}
4 {3}{234}{3}
5 {4}{234}{4}
6 {5}{2342}{5}
7 {6}{32423}{6}
```

x	something	y
1	42	1
2	234	2
3	234	3
4	234	4
5	2,342	5
6	32,423	6

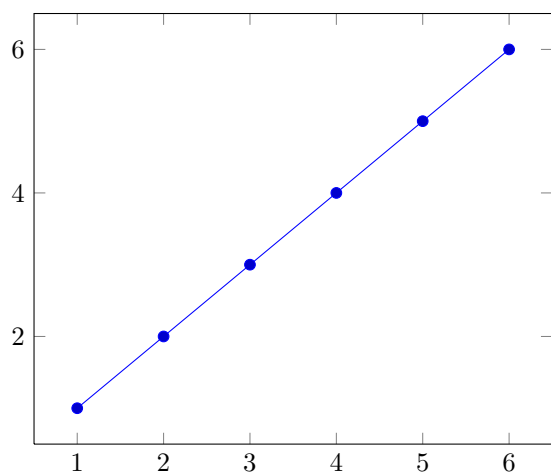
col sep=braces.



```
1 a_long_x_name.some_thing.y
2 1.42.1
3 2.234.2
4 3.234.3
5 4.234.4
6 5.2342.5
7 6.32423.6
```

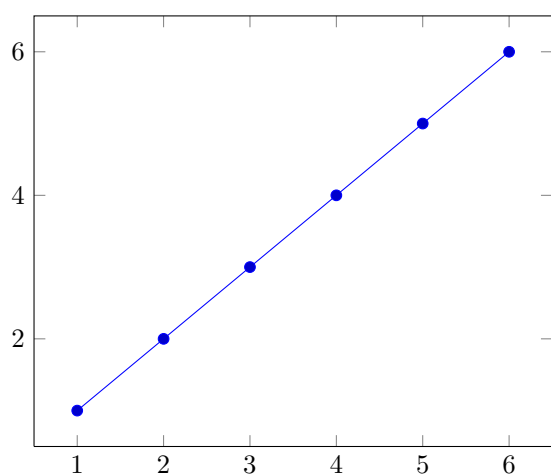

a long x name	some thing	y
1	42	1
2	234	2
3	234	3
4	234	4
5	2,342	5
6	32,423	6

col sep=tab.

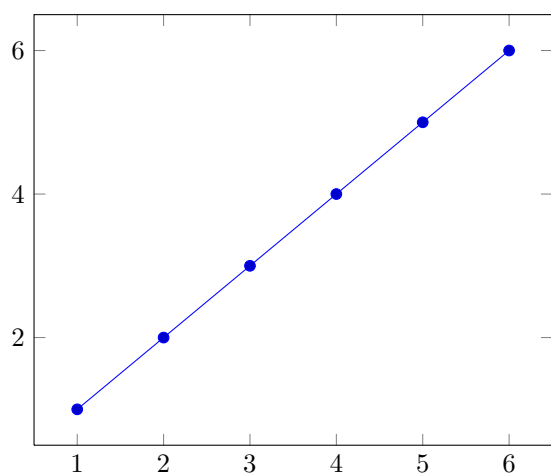


1.3.1 the same with active characters

col sep=semicolon.



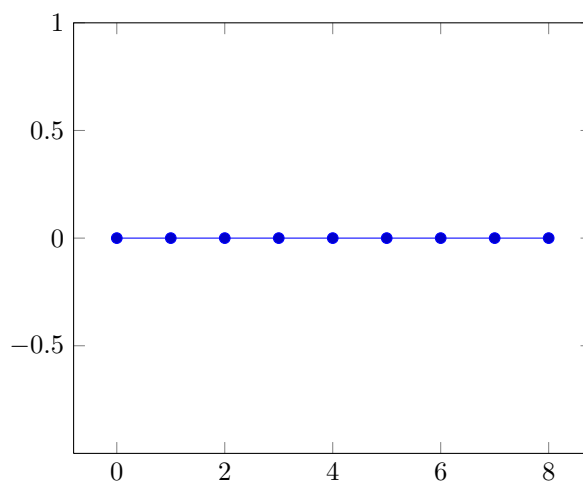
col sep=colon.



1.4 'plot file' sanity checking test

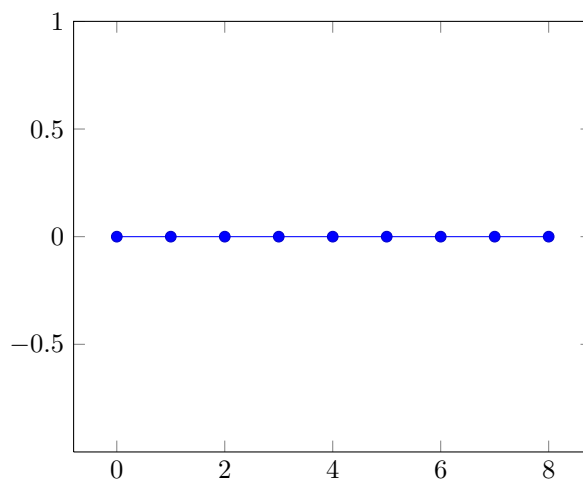
1.4.1 2d

The input file has just one column.



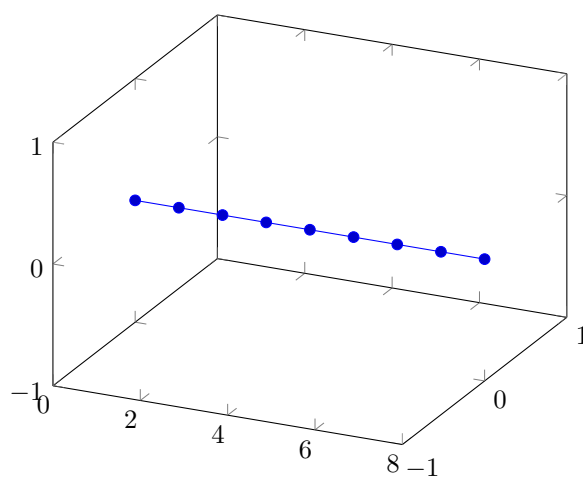
1.4.2 2d + meta

The input file has just one column.



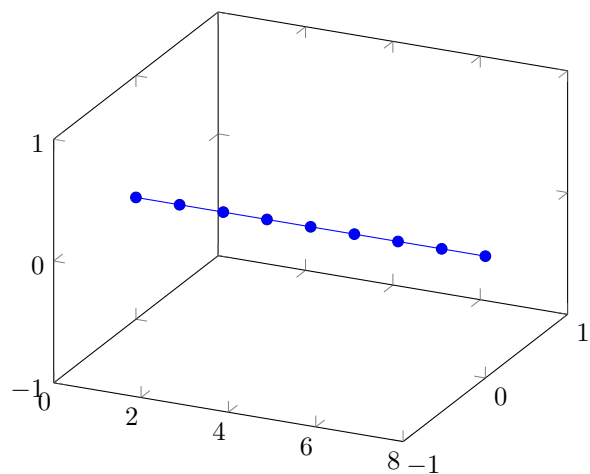
1.4.3 3d

The input file has just one column.



1.4.4 3d + meta

The input file has just one column.



Chapter 2

pgfplotstest.colormap.tex

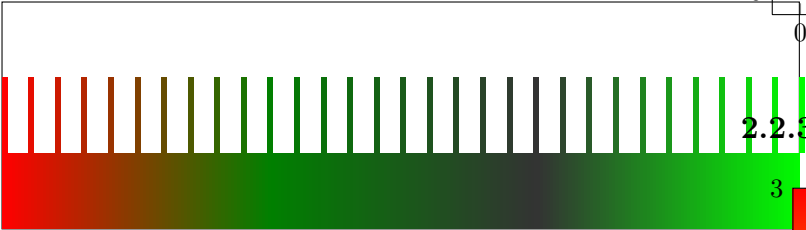
2.1 Basic level experiment

Experiment:

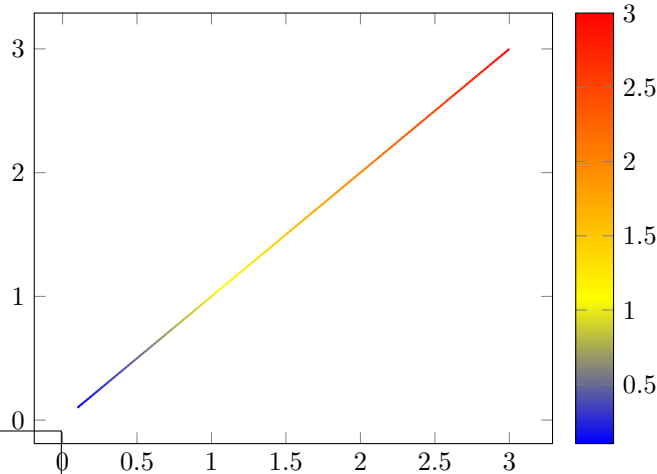
- Define a color map,
- convert it back to a shading; draw that shading,
- for a set of sample points, map them linearly into the color map and draw small “tick” lines over the shading.

The test PASSES IF AND ONLY IF: the shading and the “tick” lines have the same color.

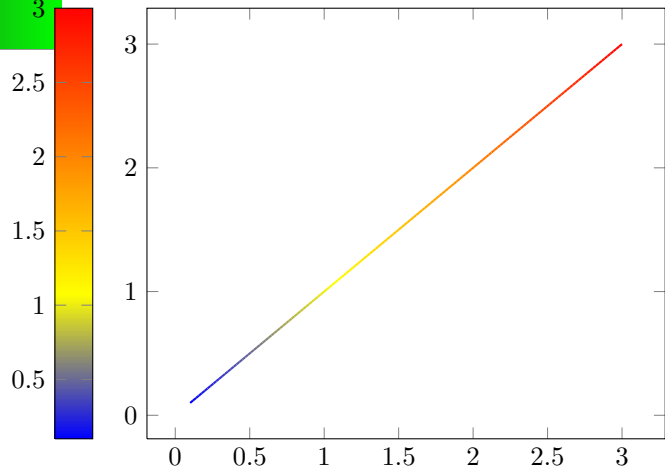
Color spec: `rgb(0cm)=(1,0,0);` `rgb(2cm)=(0,0.5,0);`
`gray(4cm)=(0.2); color(6cm)=(green);`



2.2.2 colorbar right

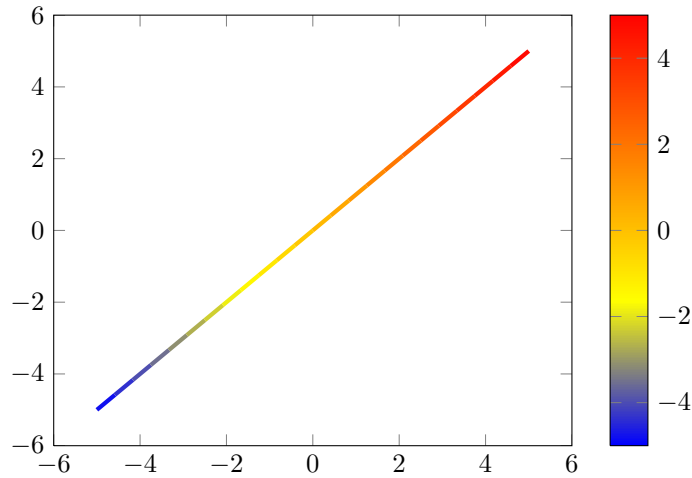


2.2.3 colorbar left

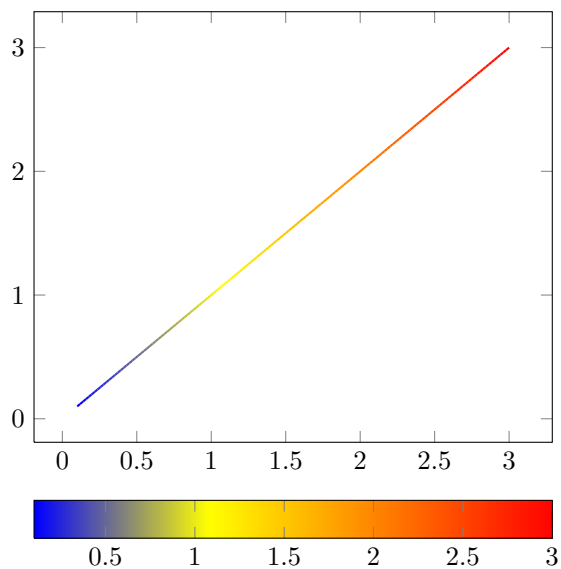


2.2 Colorbars

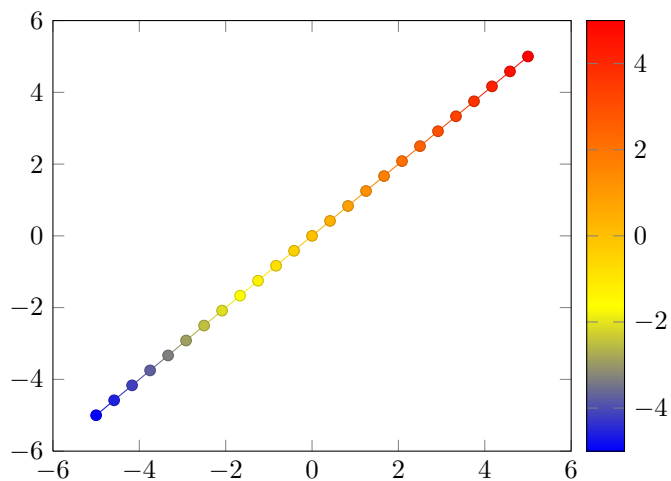
2.2.1 default config



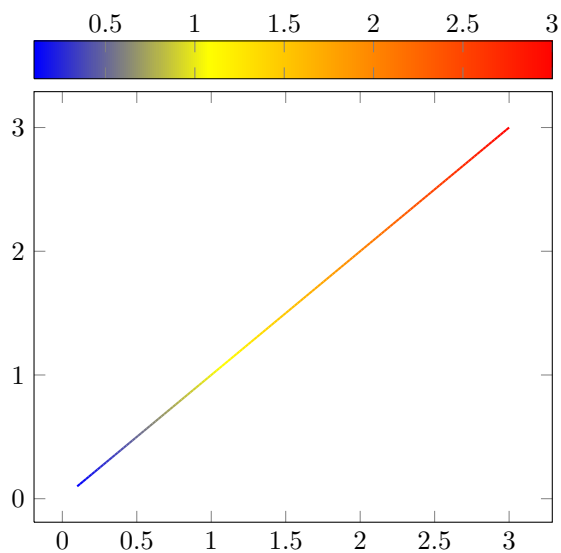
2.2.4 colorbar horizontal



2.2.7 Testing at=(1.03,0.5),anchor=west

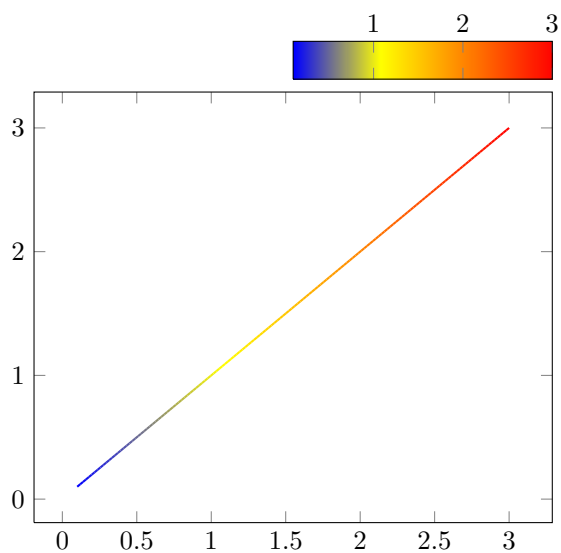


2.2.5 colorbar horizontal; top with customization



2.2.6 colorbar horizontal; top with even more customization

More Customization: "colorbar top"



Chapter 3

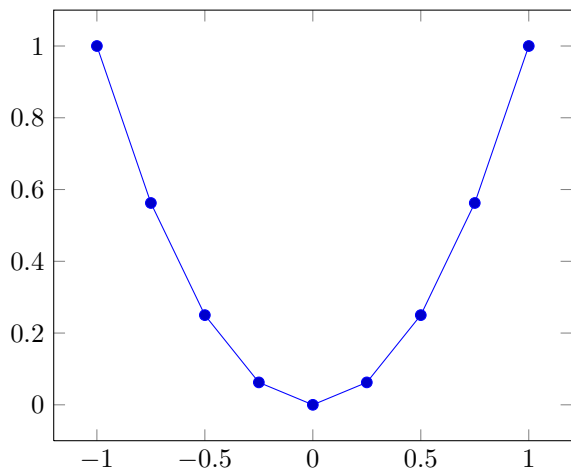
pgfplotstest.marks.tex

3.1 Testing special treatment for no marks and only marks

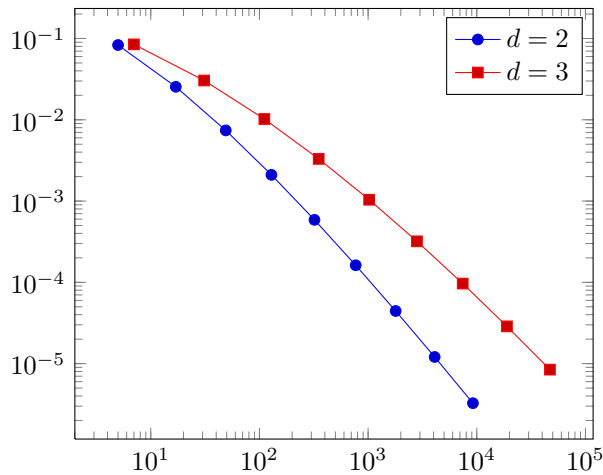
3.1.2 only marks

3.1.1 both, marks and lines

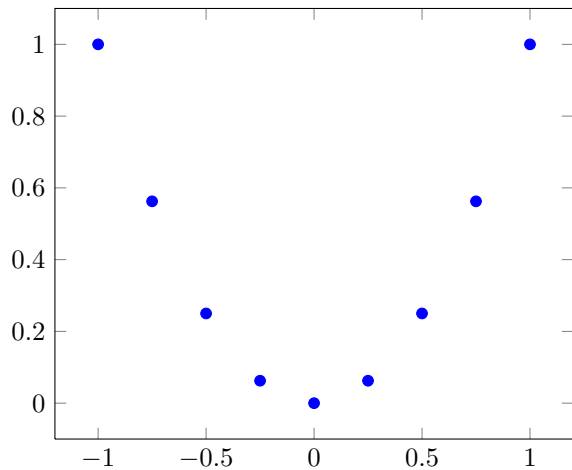
Normal plot



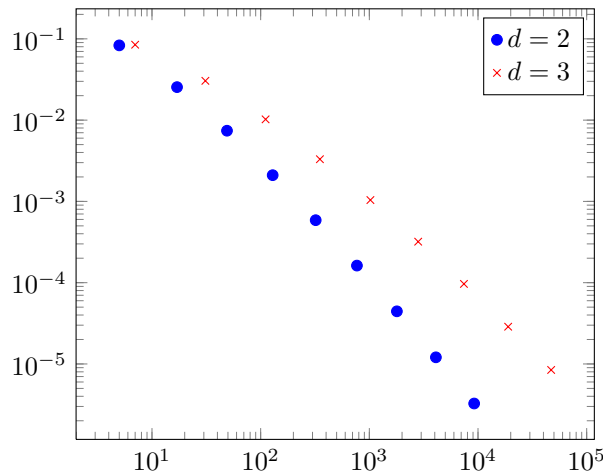
log plot



Normal plot

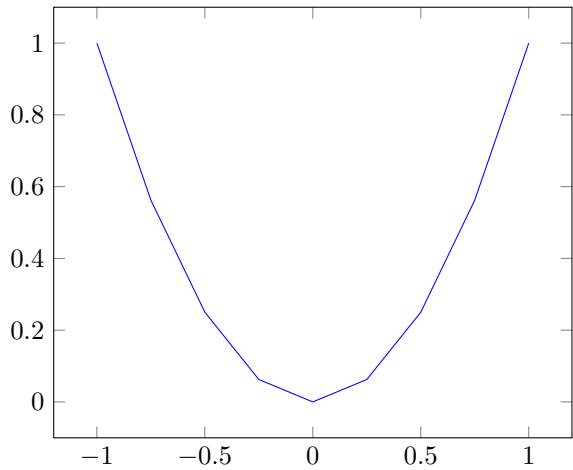


log plot

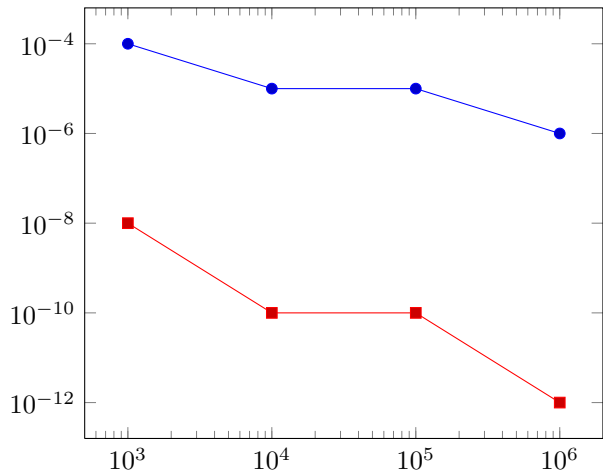


3.1.3 no marks

Normal plot

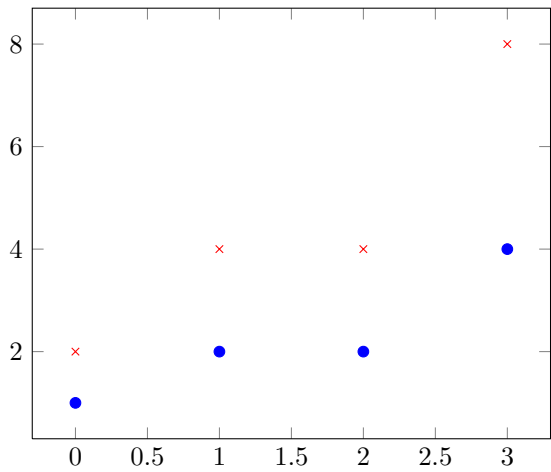


log plot



3.2.2 only marks

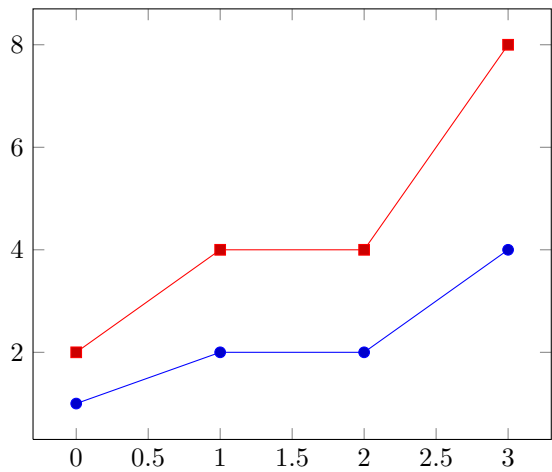
Normal plot



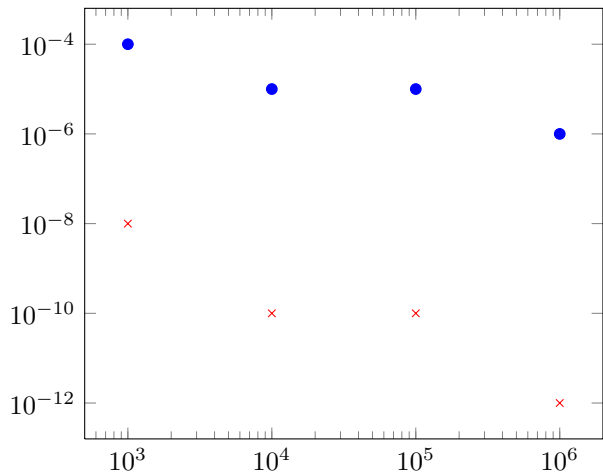
3.2 Testing special treatment for no marks and only marks for STACKED PLOTS

3.2.1 both, marks and lines

Normal plot

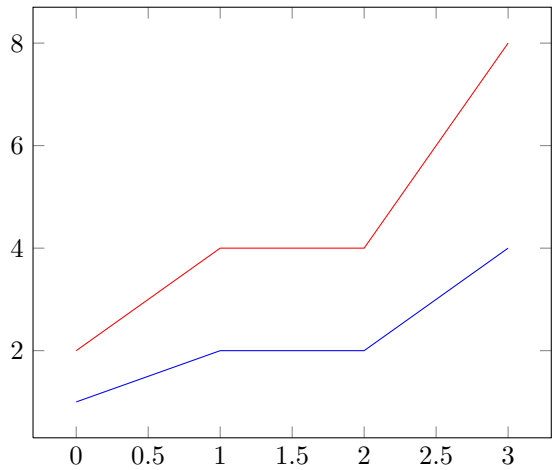


log plot

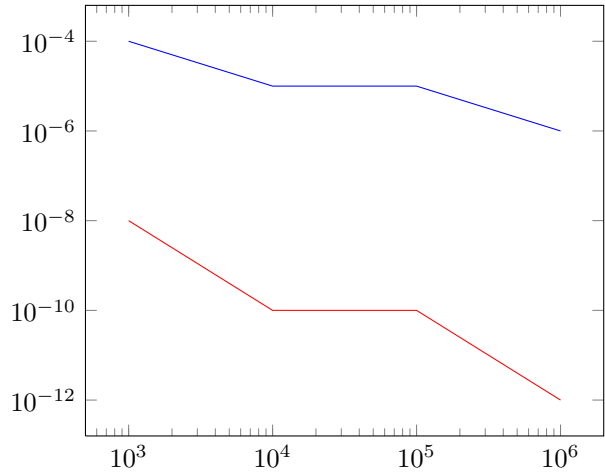


3.2.3 no marks

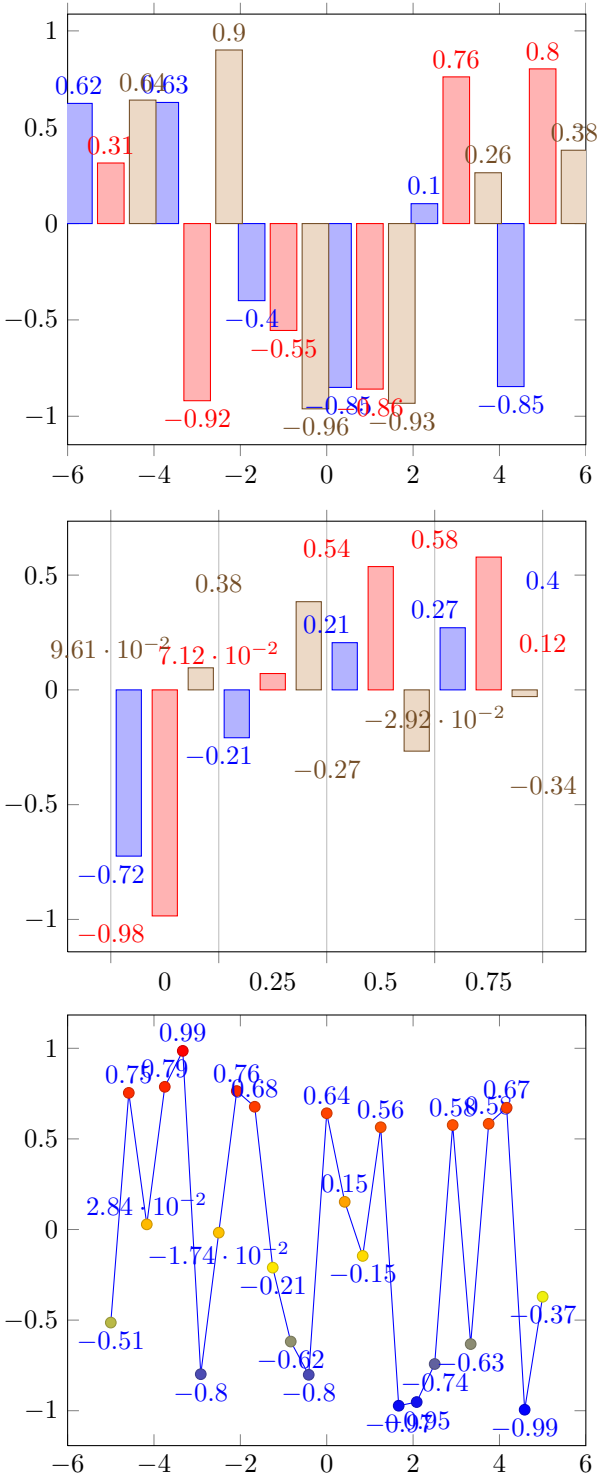
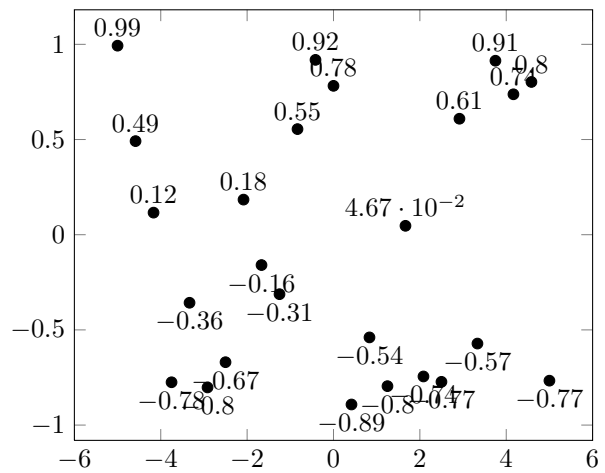
Normal plot



log plot



3.3 nodes near coords

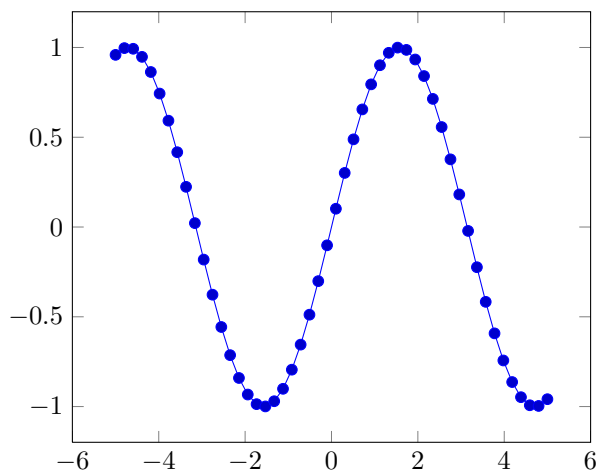


Chapter 4

pgfplotstest.function.tex

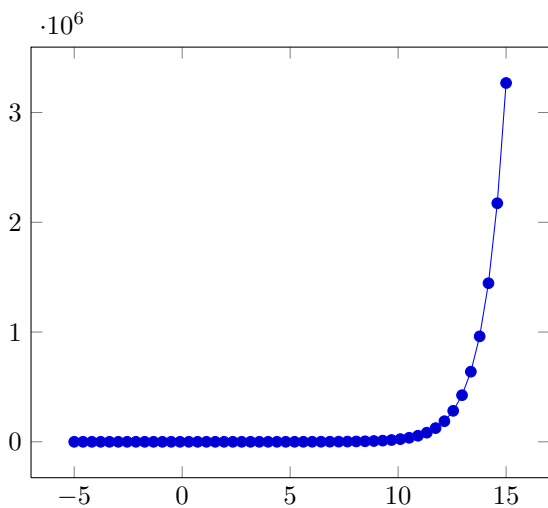
4.1 ‘plot function’ test

4.1.1 $\sin(x)$

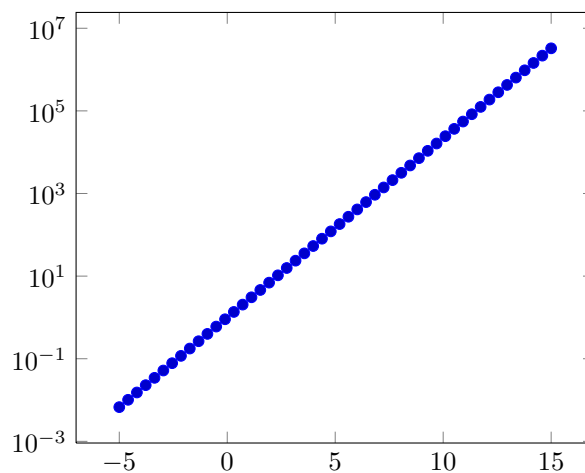


4.1.2 $\exp(x)$

linear



semilogy

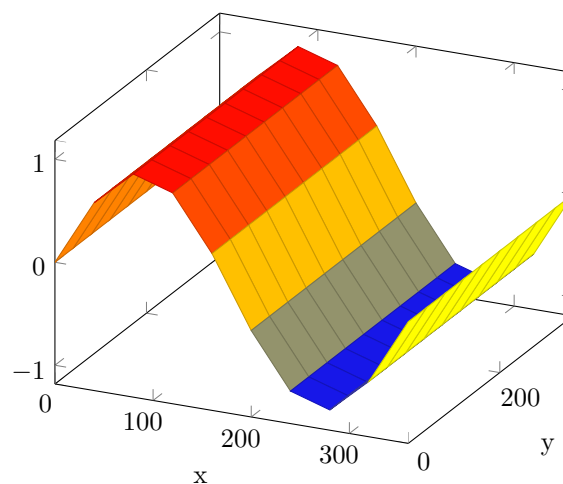


4.2 3D plots

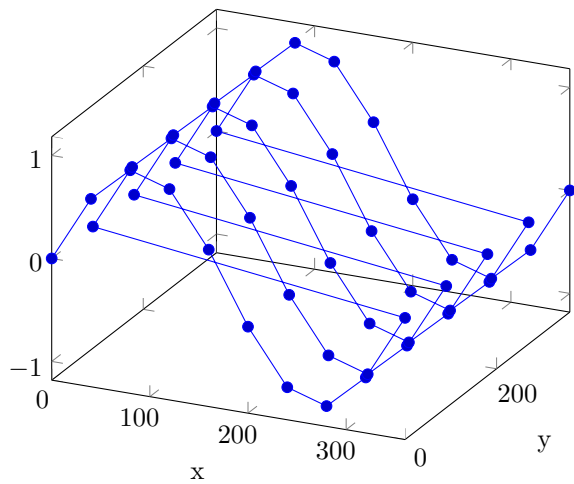
4.2.1 plot expression

All plots use samples=10,/tikz/domain=0:360 as default!

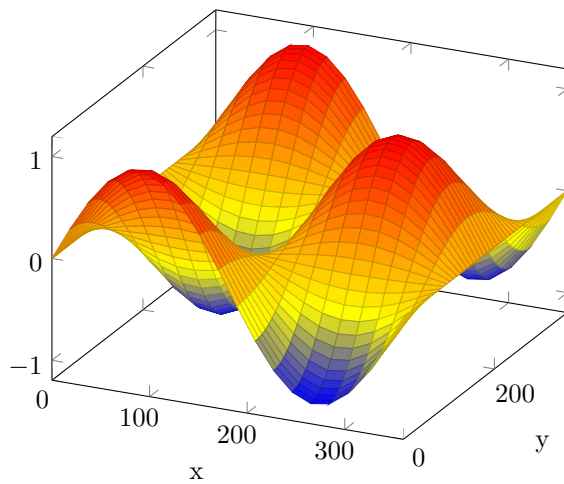
default params



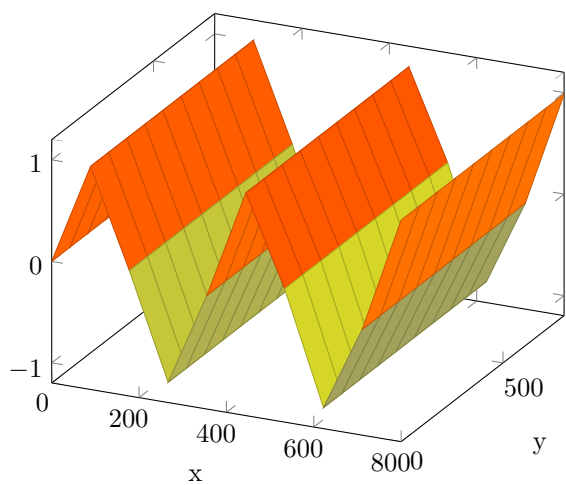
z buffer=none and fewer samples



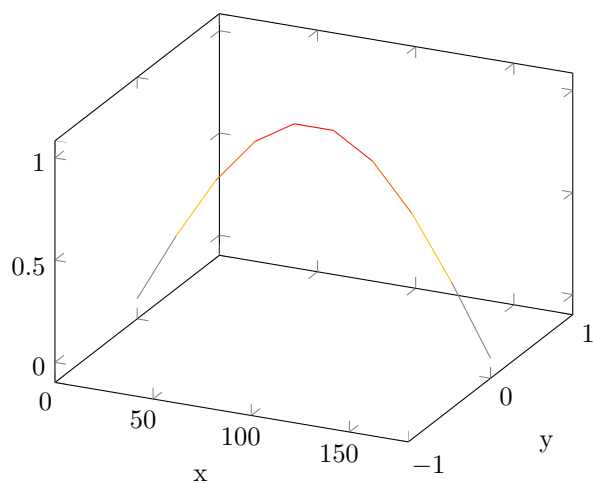
samples, samples y



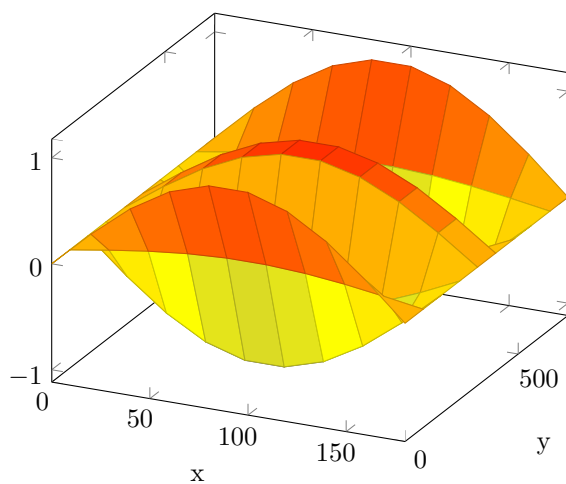
domain set



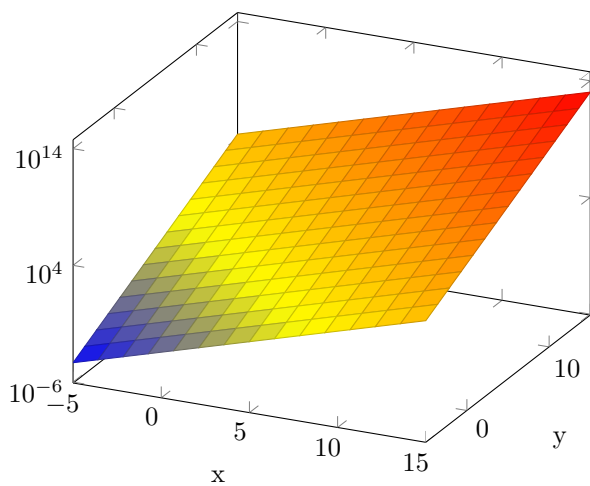
a line plot



domain, domain y



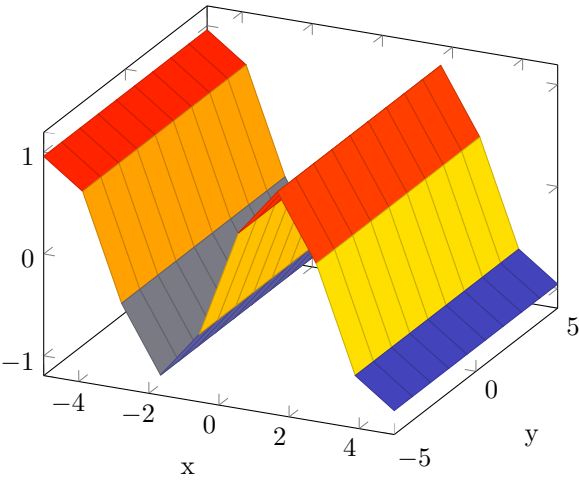
log in z ($\exp(x+y)$)



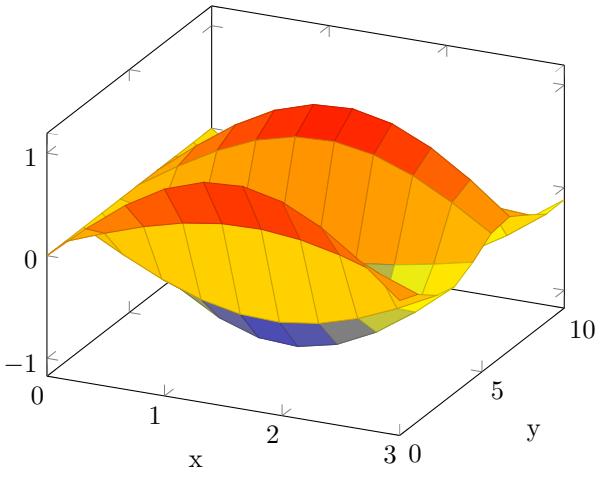
4.2.2 plot gnuplot

All plots use samples=10 as default!

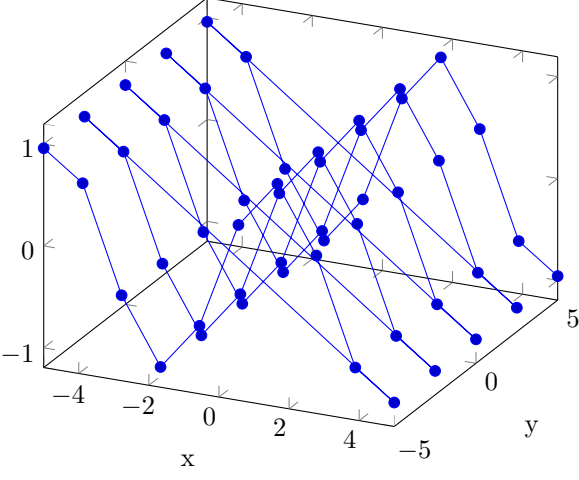
default params



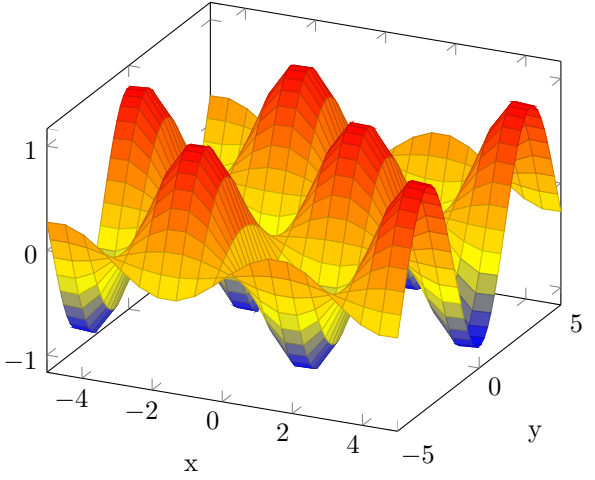
domain, domain y



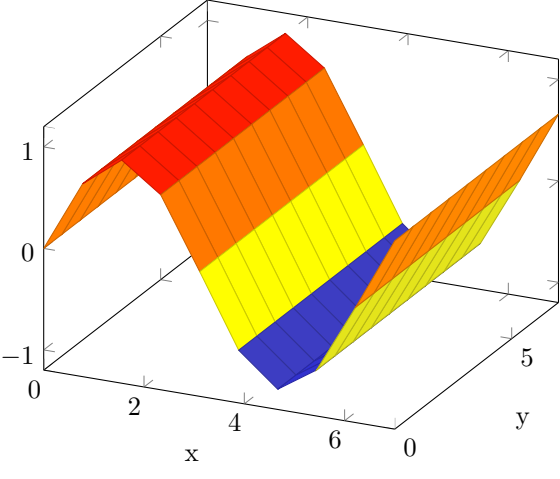
z buffer=none and fewer samples



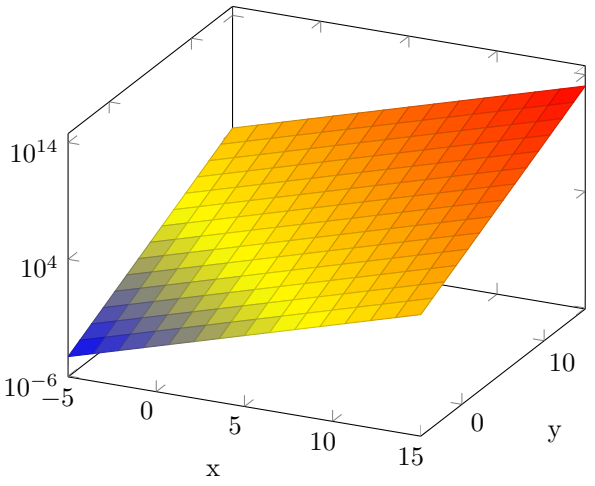
samples, samples y



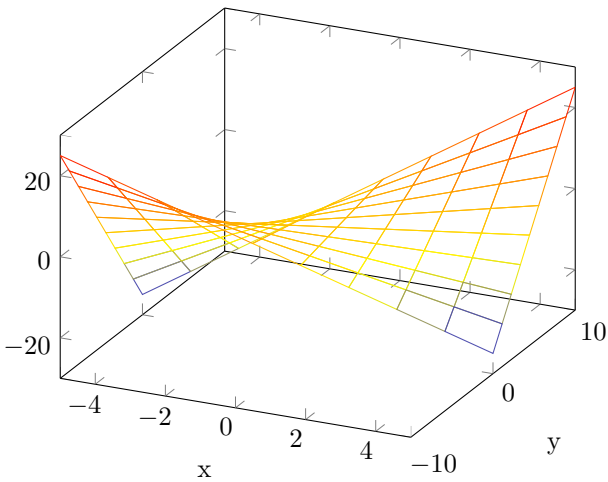
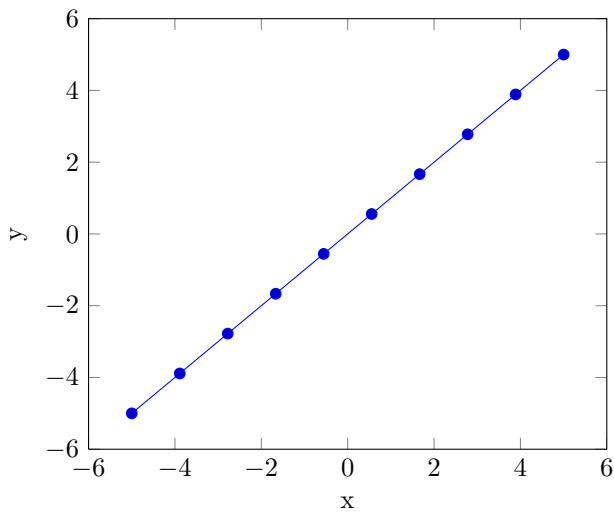
domain set



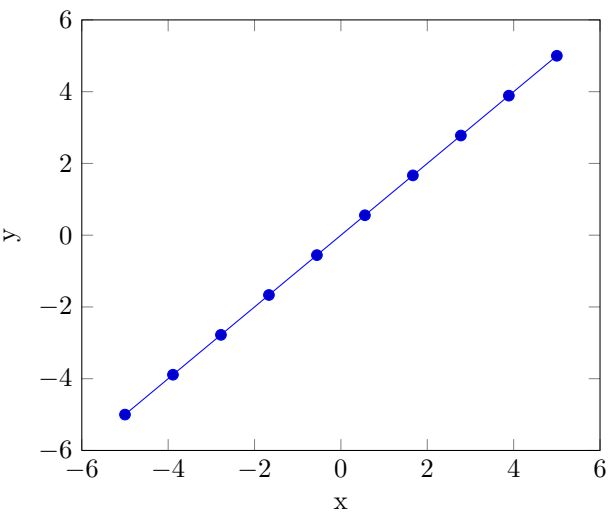
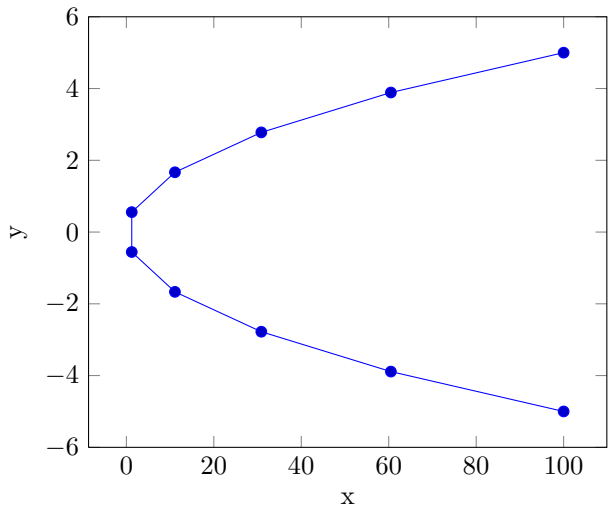
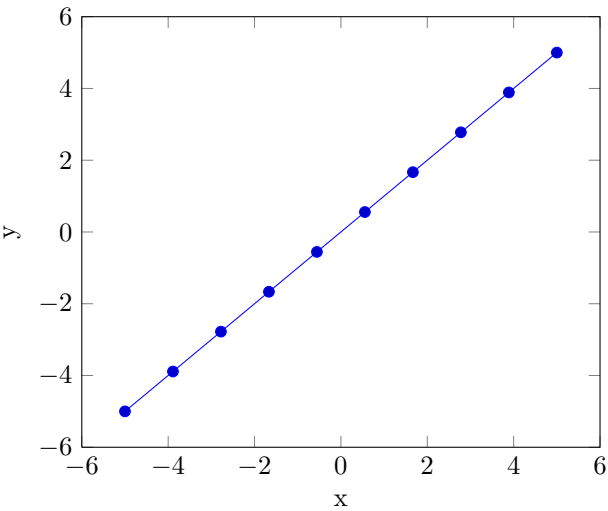
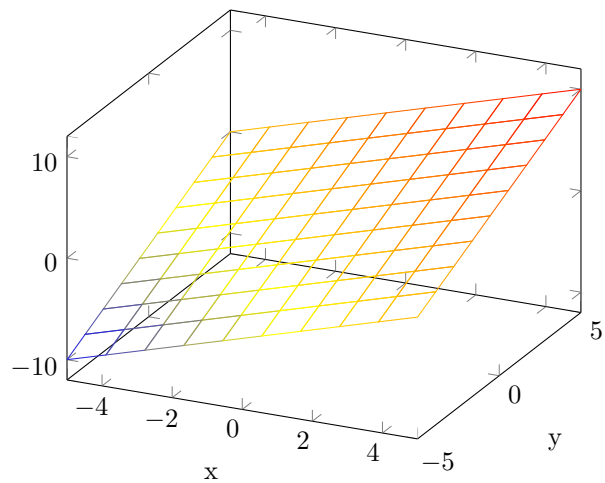
log in z (exp(x+y))

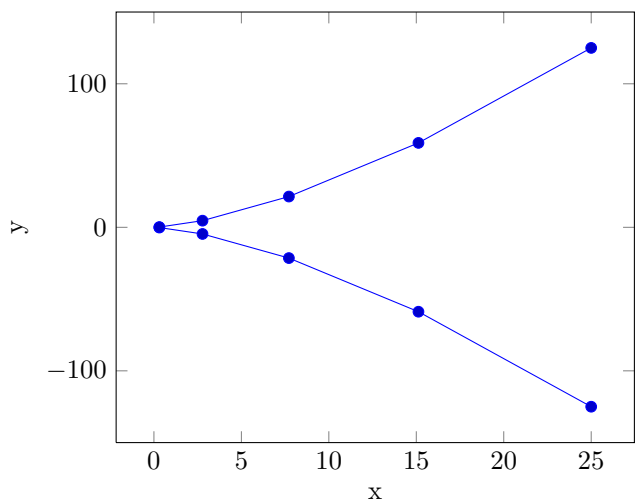


Checking the dummy variable names of the default config



non-standard values



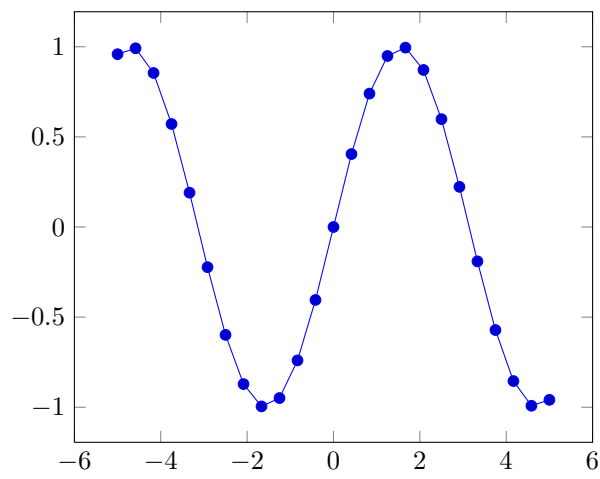


Chapter 5

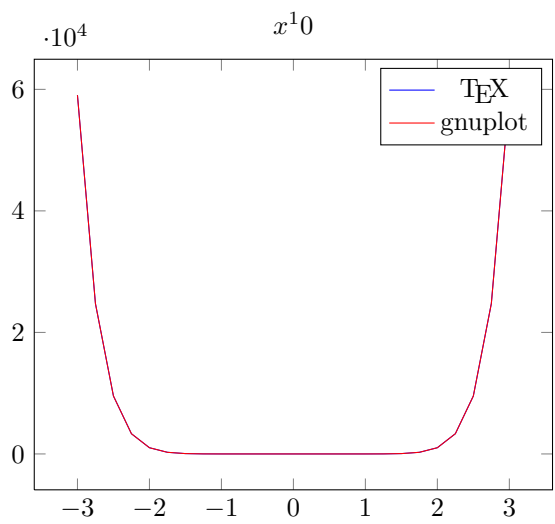
pgfplotstest.expr.tex

5.1 ‘plot expression’ test

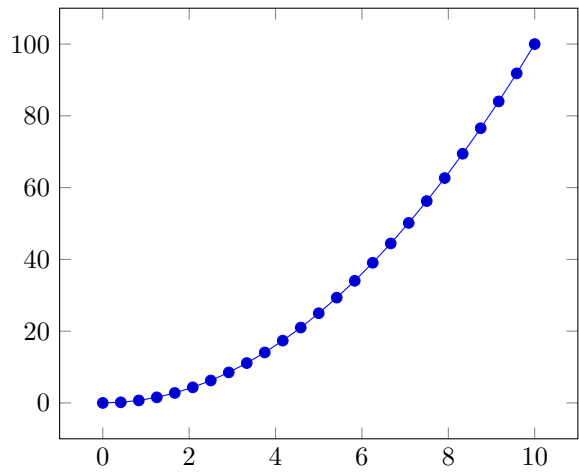
5.1.1 $\sin(x)$



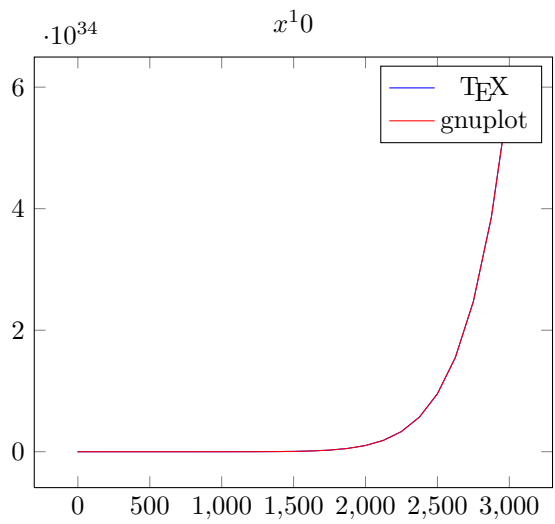
5.1.3 x^{10}



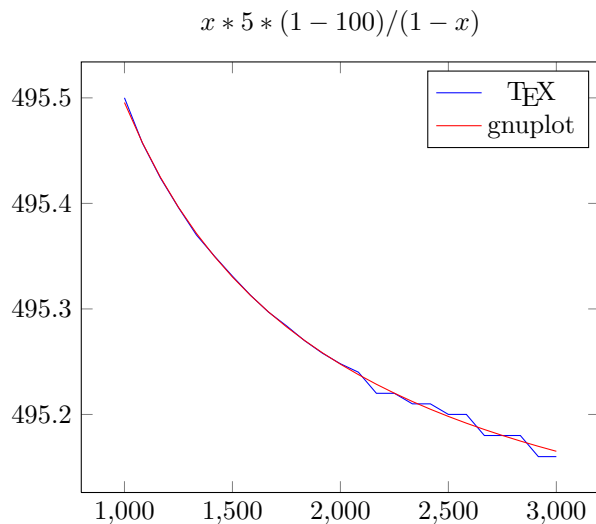
5.1.2 x^2



5.1.4 x^{10}

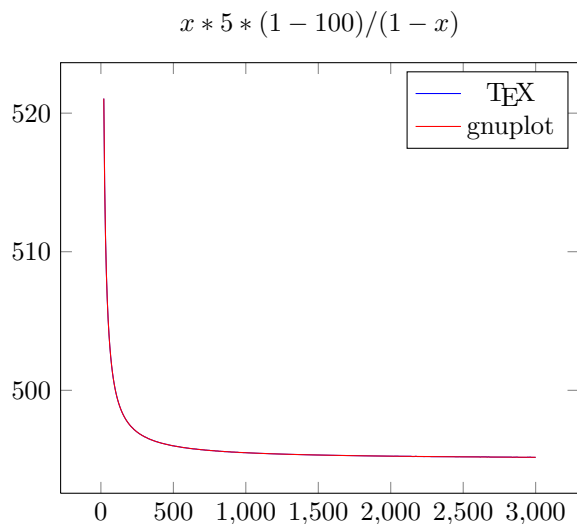


5.1.5 $x * 5 * (1 - 100)/(1 - x)$

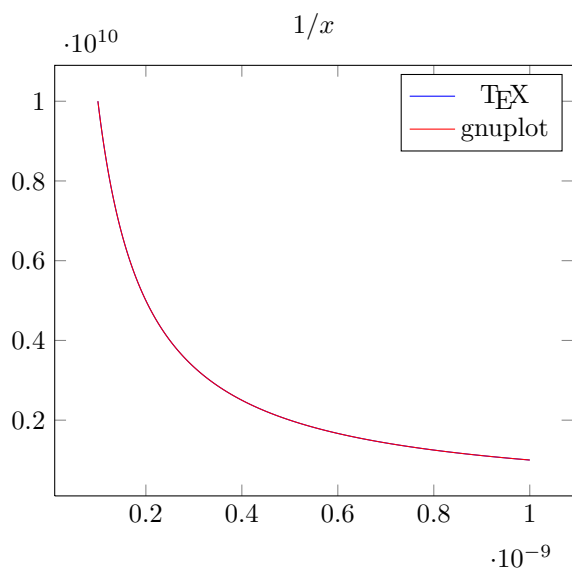


Das liegt an der relativen Genauigkeit und an der enge des datenbereichs:

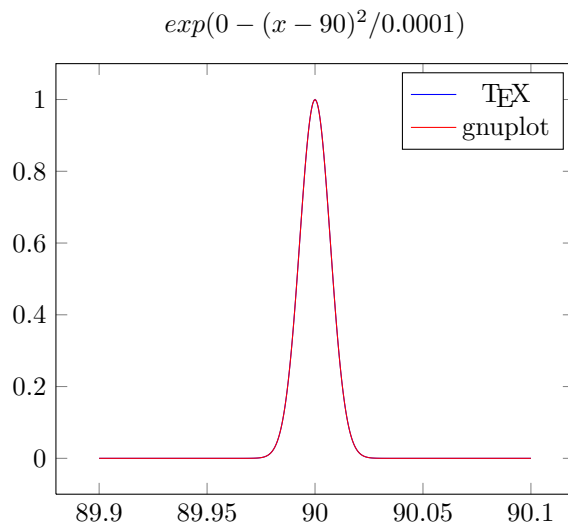
5.1.6 $x * 5 * (1 - 100)/(1 - x)$



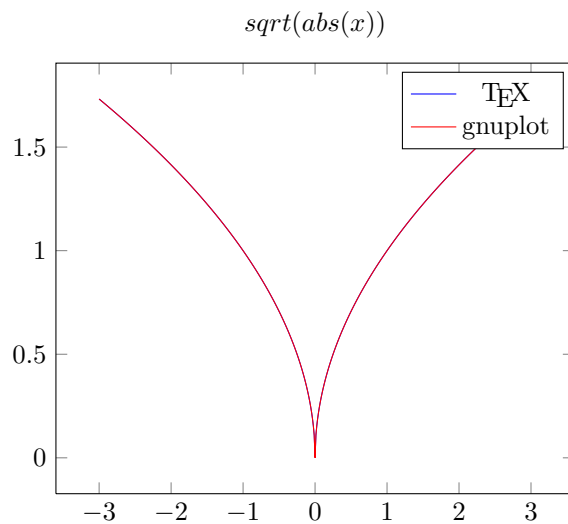
5.1.7 $1/x$



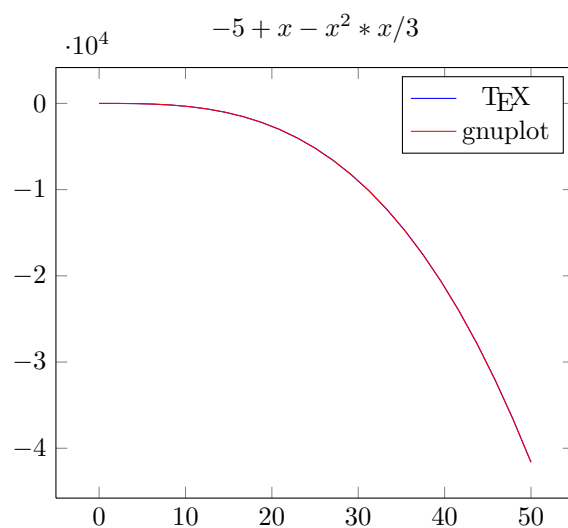
5.1.8 $exp(0 - (x - 90)^2/0.0001)$



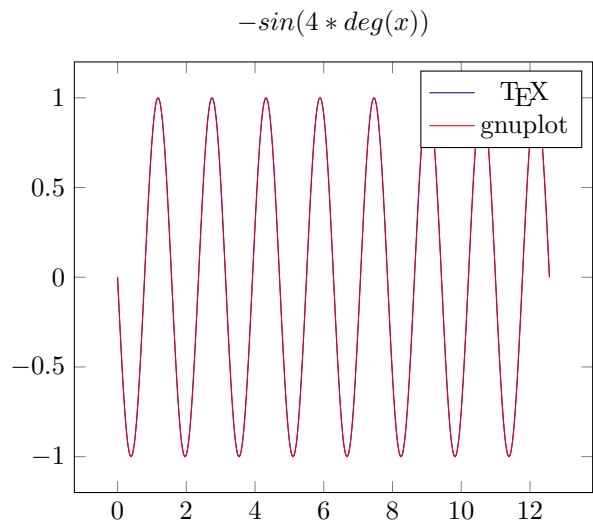
5.1.9 $sqrt(abs(x))$



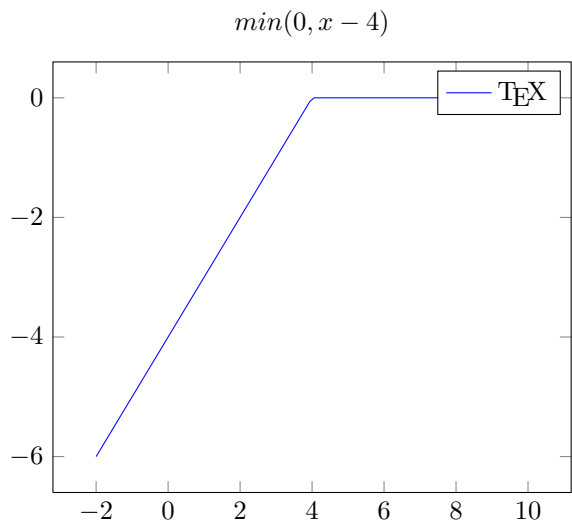
5.1.10 $-5 + x - x^2 * x/3$



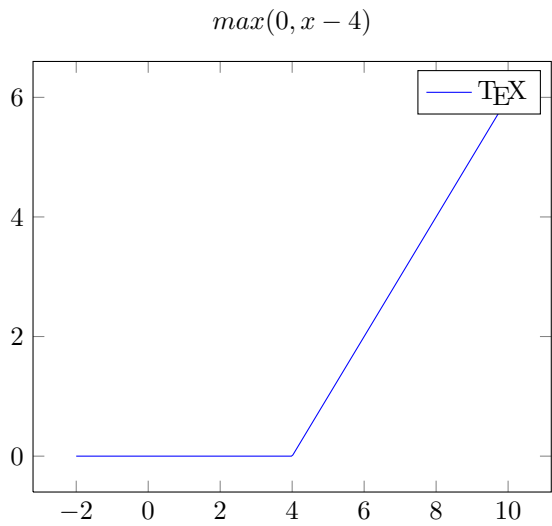
5.1.11 $-\sin(4 * \deg(x))$



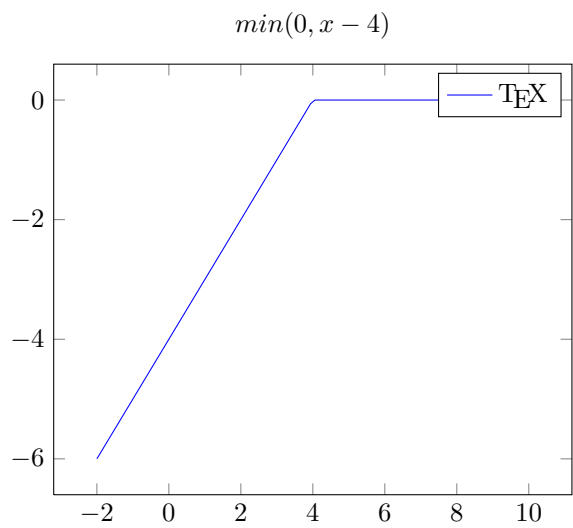
5.1.14 $\min(0, x - 4)$



5.1.12 $\max(0, x - 4)$



5.1.13 $\min(0, x - 4)$



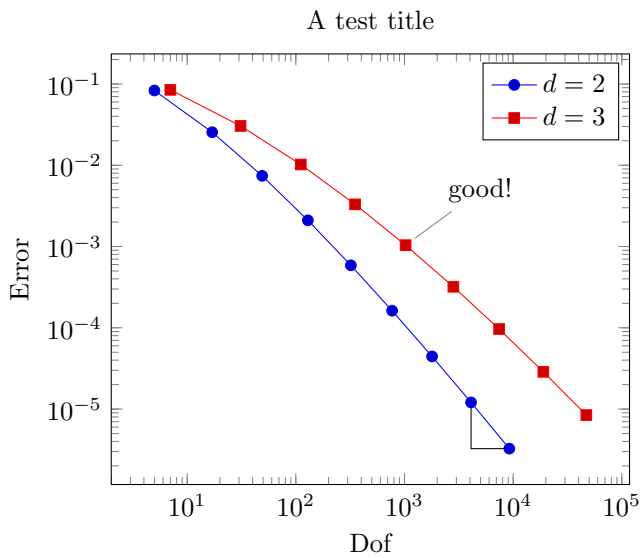
Chapter 6

pgfplotstest.axispath.tex

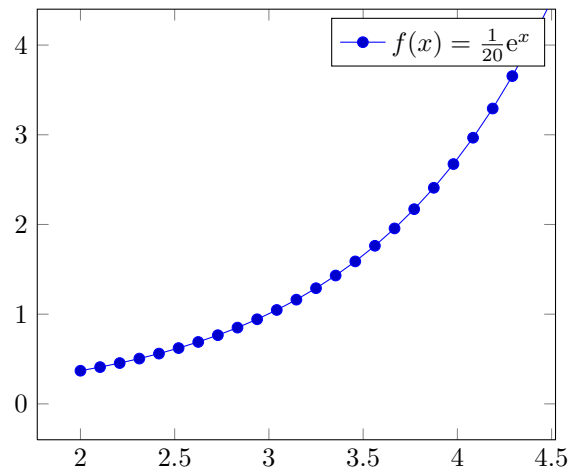
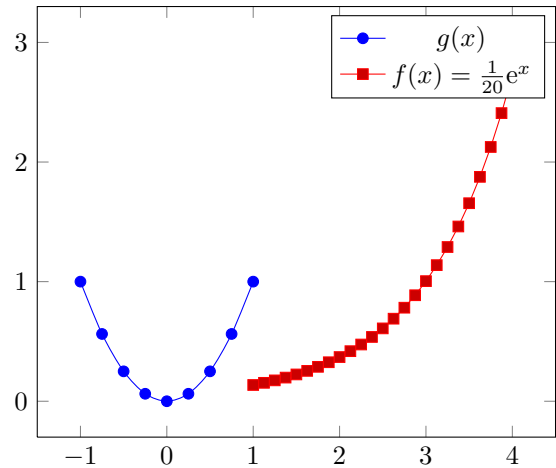
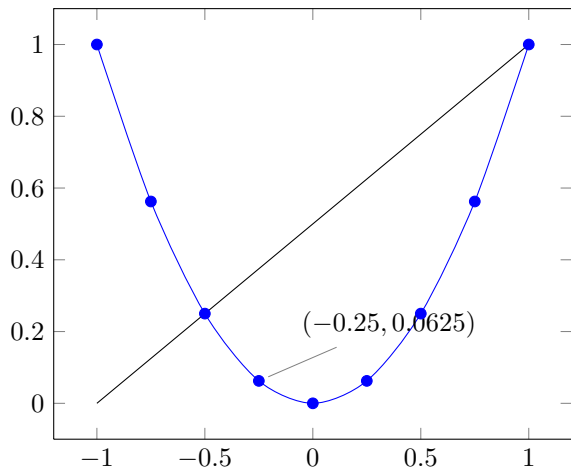
6.1 Testing path commands inside of axis

6.2 Checking plot expression

6.1.1 log plot



6.1.2 Linear plot



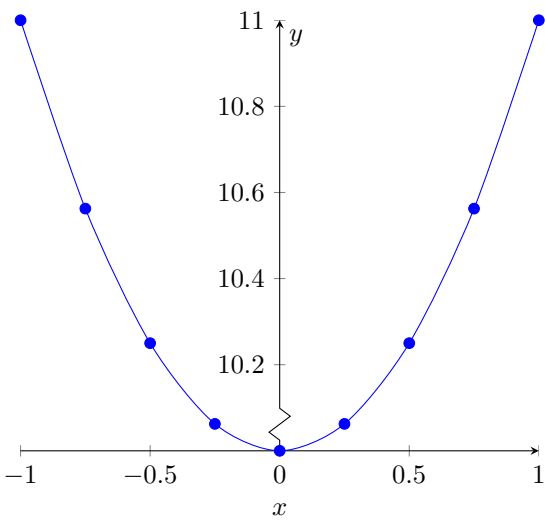
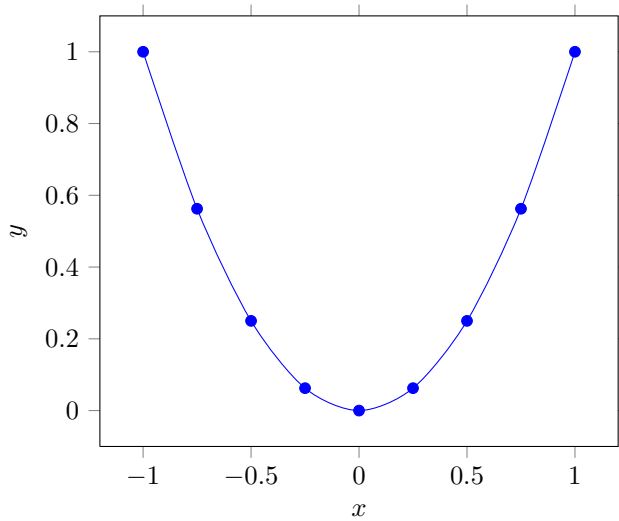
Chapter 7

pgfplotstest.axislines.tex

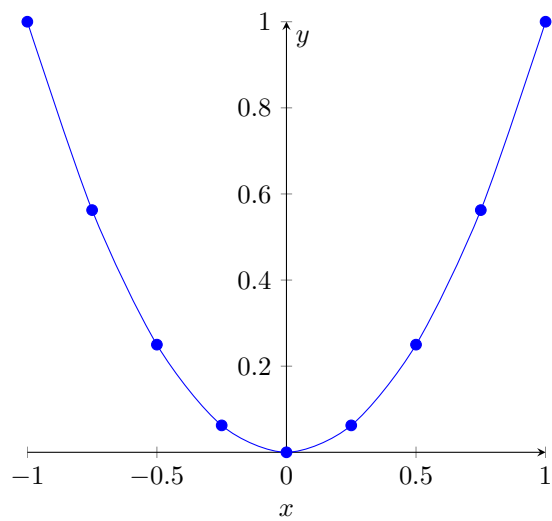
7.1 Axislines placement – centered axis lines

7.1.3 centered axis lines – axis x line=bottom, axis y line=center / tick align/ y discontin

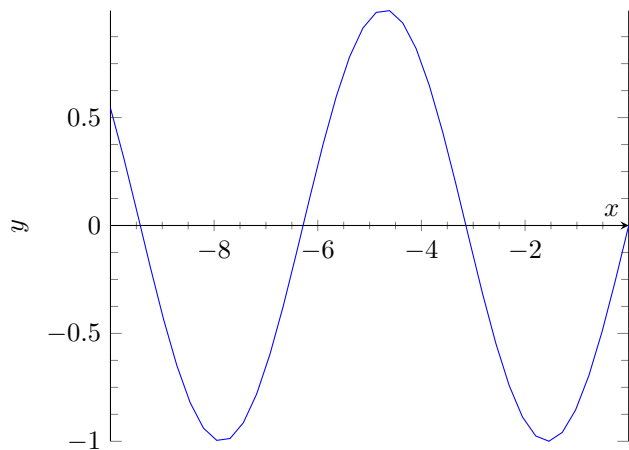
7.1.1 tick align=outside



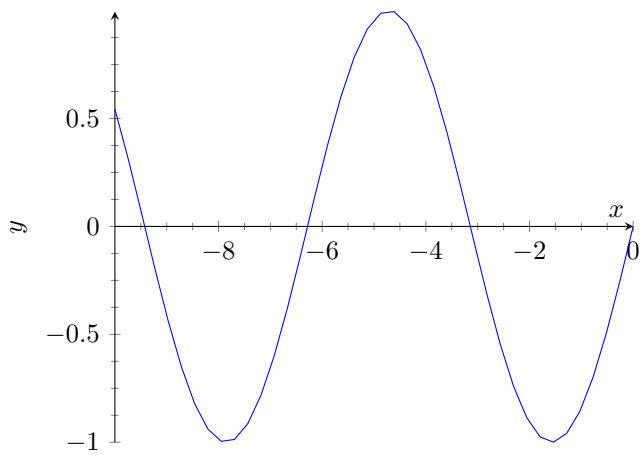
7.1.2 centered axis lines – axis line=center, axis x line=bottom



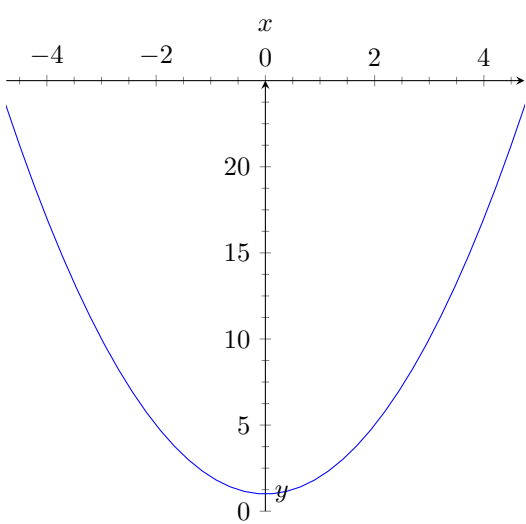
centered axis lines – axis x line=middle, axis y line=box



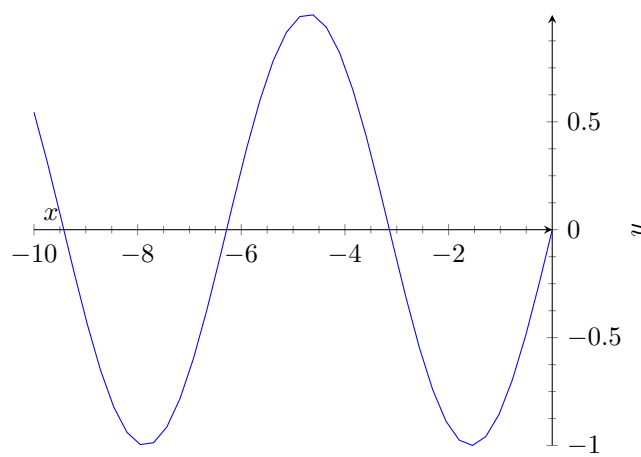
centered axis lines - axis x line=middle, axis y line=left



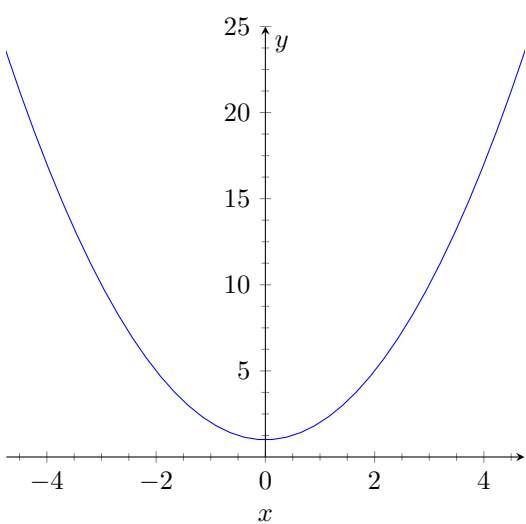
centered axis lines - axis x line=top, axis y line=center



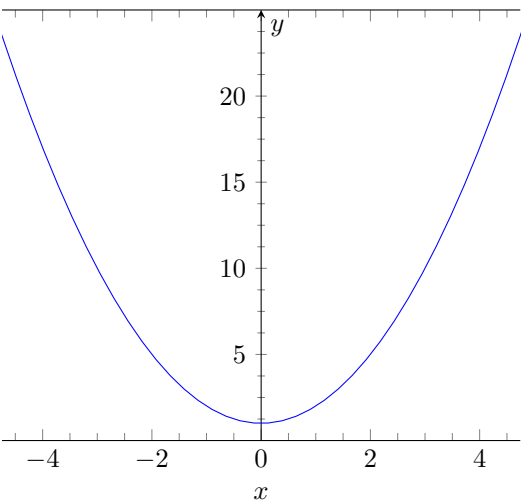
centered axis lines - axis x line=middle, axis y line=right



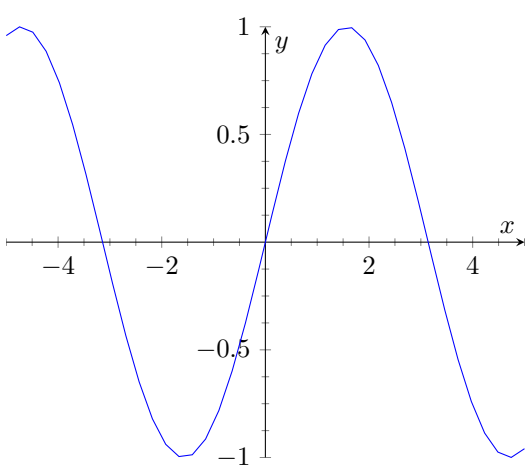
centered axis lines - axis x line=bottom, axis y line=center



centered axis lines - axis x line=box, axis y line=center



centered axis lines - axis x line=middle, axis y line=center

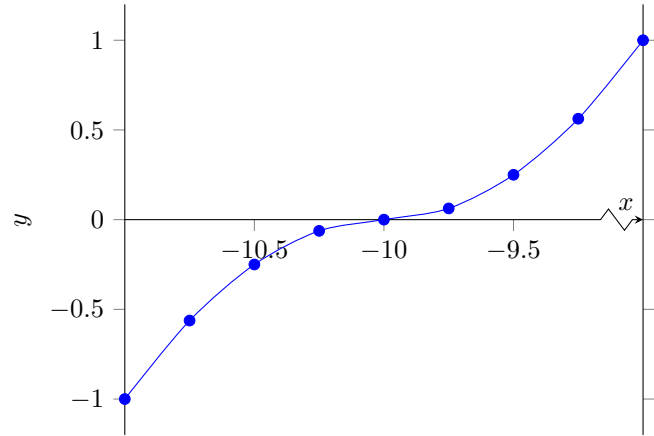
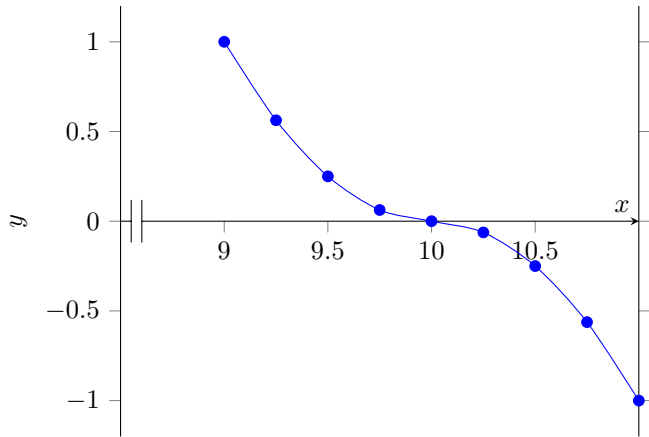


7.1.4

centered axis lines – axis [xy] line/ tick align/ x scont

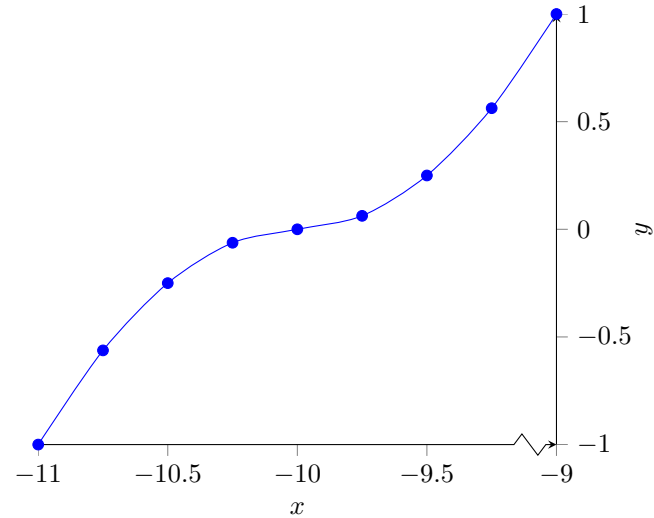
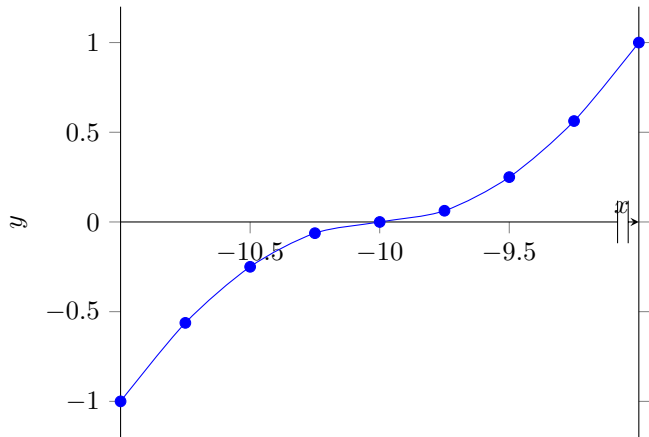
centered axis lines - middle/box crunch parallel

centered axis lines - middle/box parallel

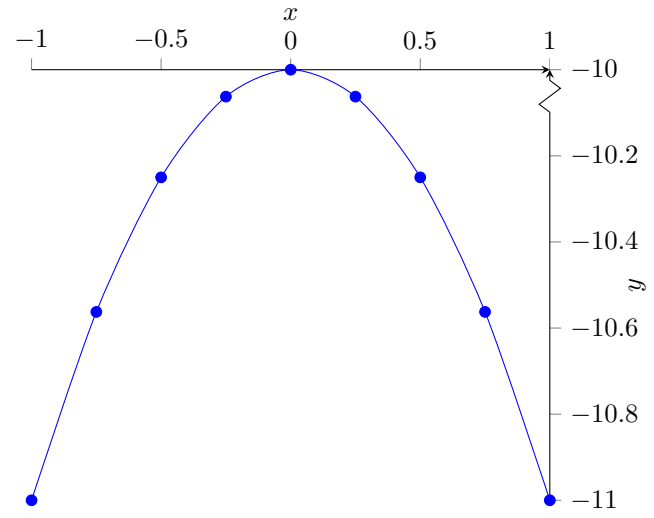
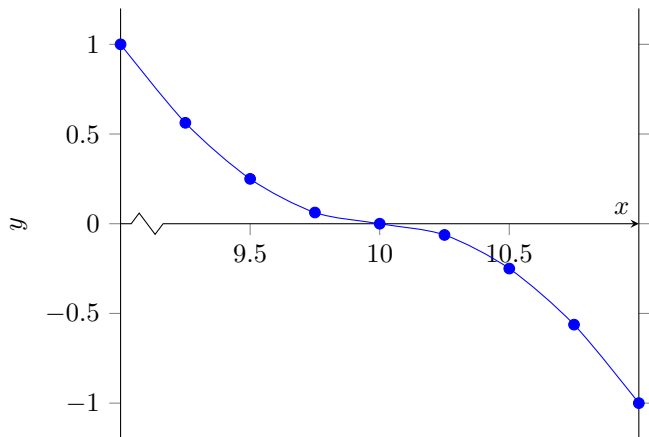


centered axis lines - middle/box crunch parallel

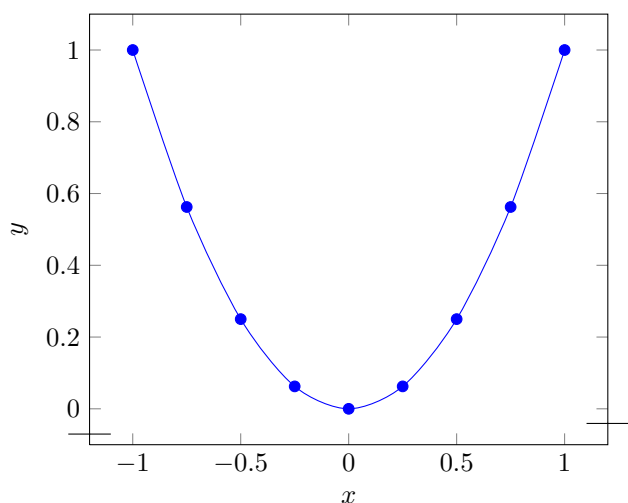
centered axis lines - middle/box parallel (2)



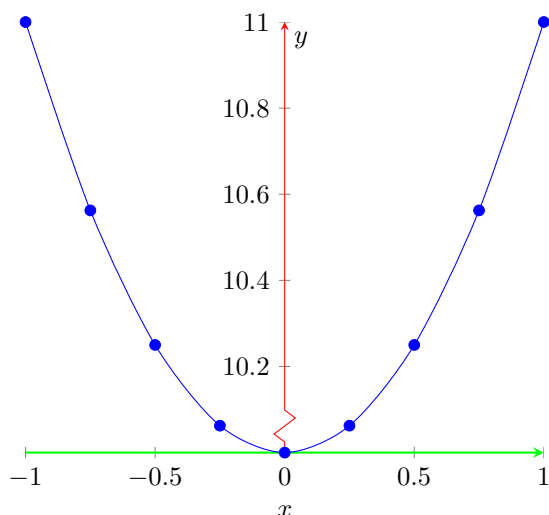
centered axis lines - middle/box crunch



7.1.5 centered axis lines – axis y discontinuity

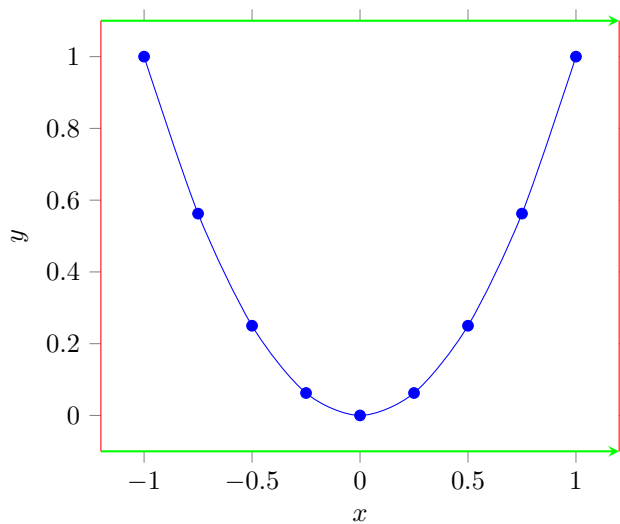


7.2.3 Separate lines – axis x line=bottom, axis y line=center / tick align/ y discont

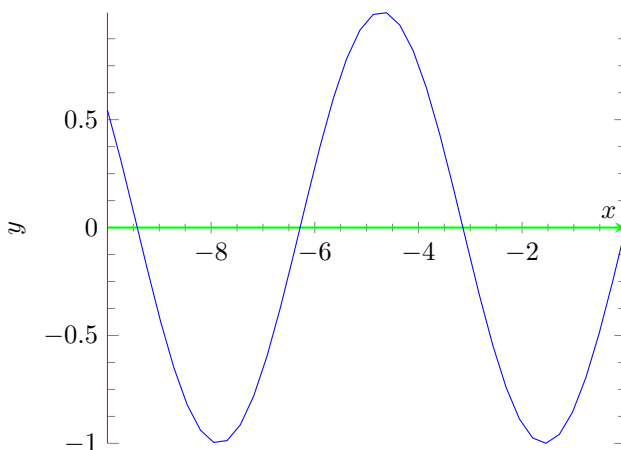


7.2 Axislines placement – Separate lines

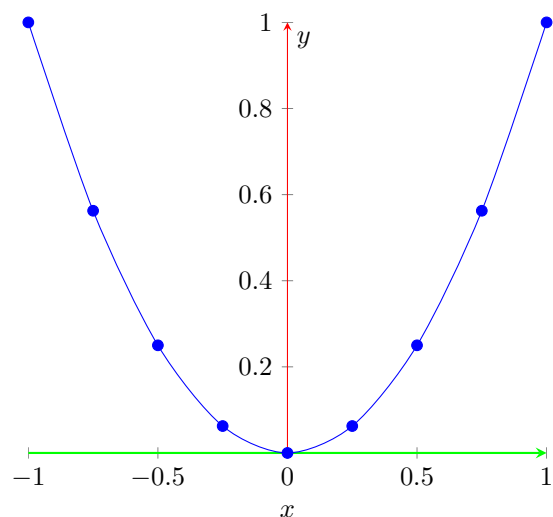
7.2.1 tick align=outside



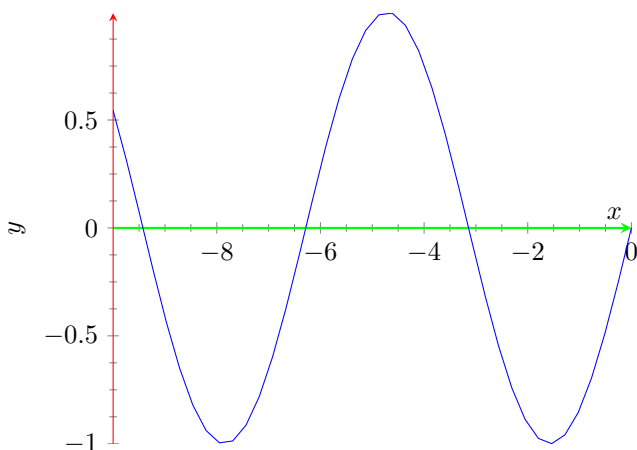
Separate lines – axis x line=middle, axis y line=box



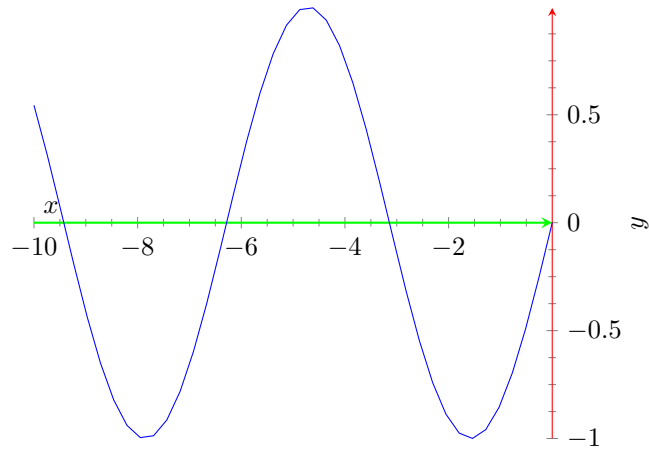
7.2.2 Separate lines – axis y line=center, axis x line=bottom



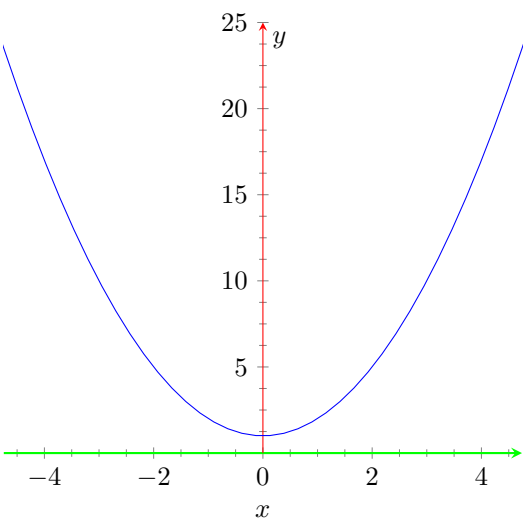
Separate lines – axis x line=middle, axis y line=left



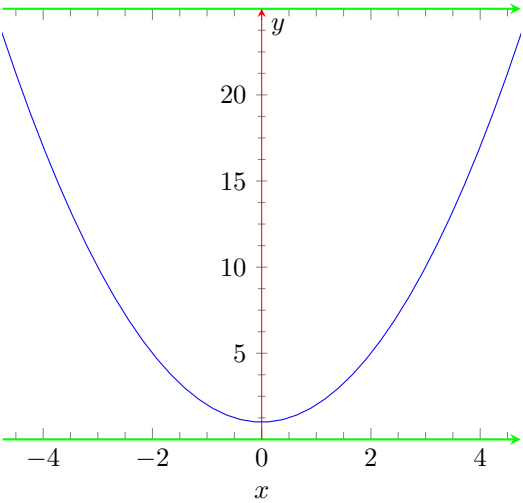
Separate lines – axis x line=middle, axis y line=right



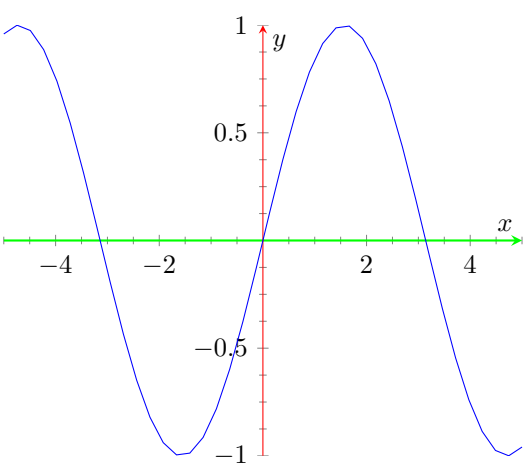
Separate lines – axis x line=bottom, axis y line=center



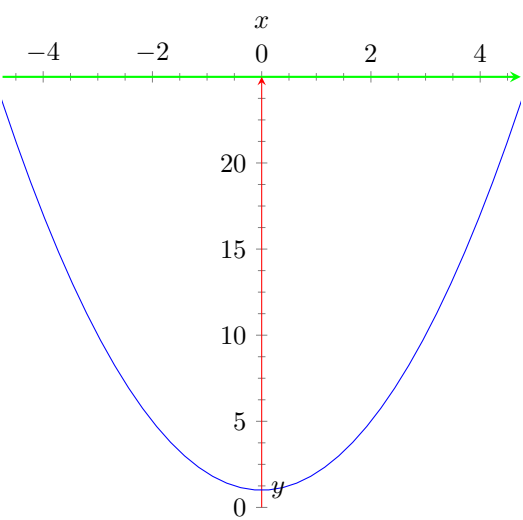
Separate lines – axis x line=box, axis y line=center



Separate lines – axis x line=middle, axis y line=center

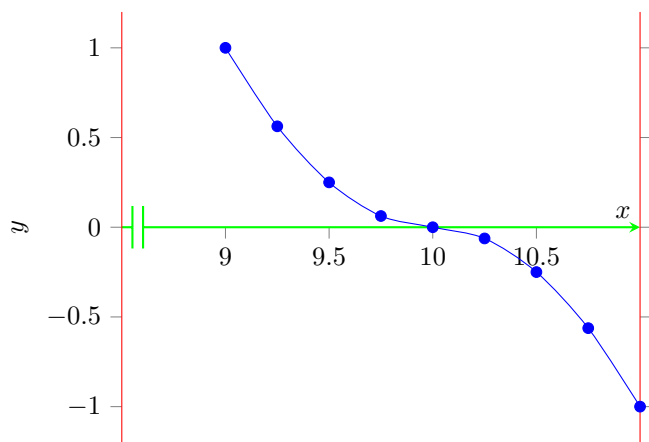


Separate lines – axis x line=top, axis y line=center

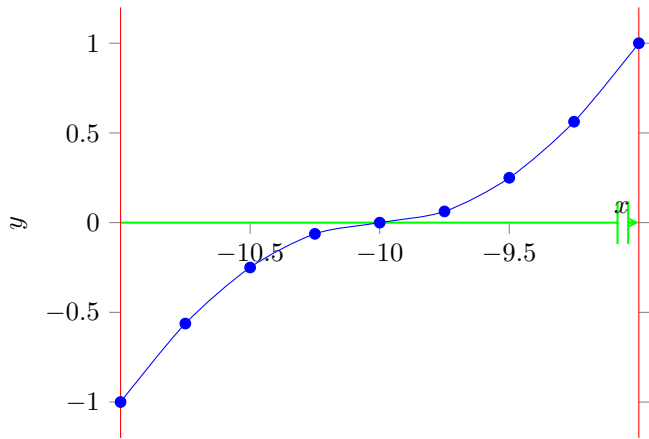


7.2.4 Separate lines – axis [xy] line/ tick align/ x discontin

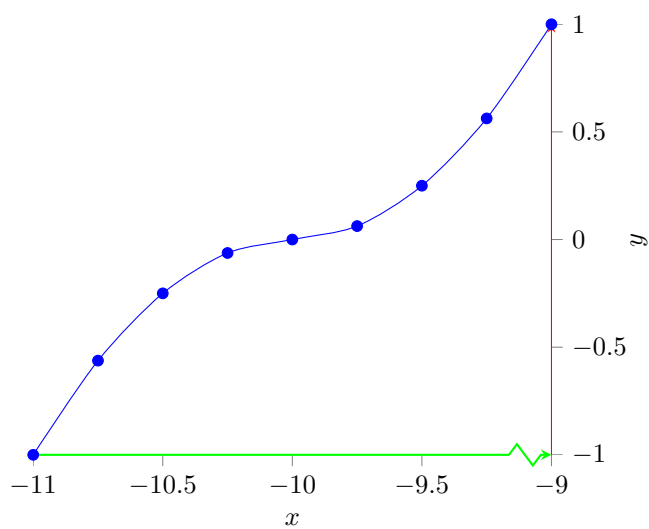
Separate lines - middle/box parallel



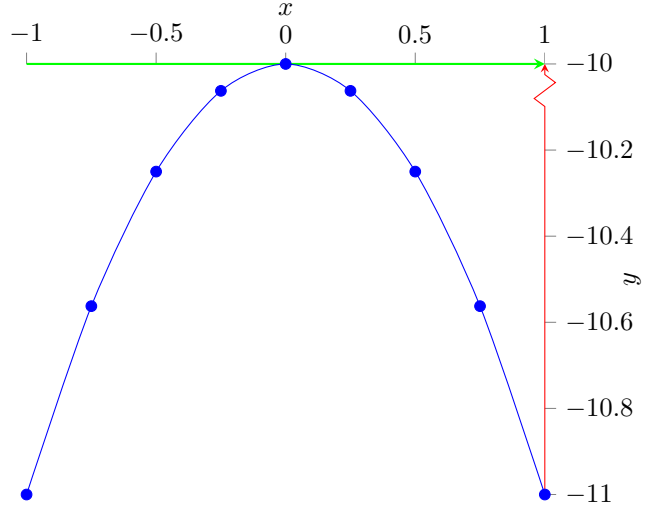
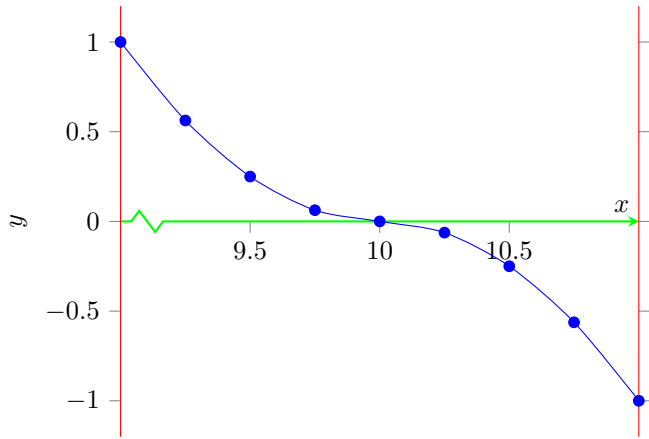
Separate lines - middle/box parallel (2)



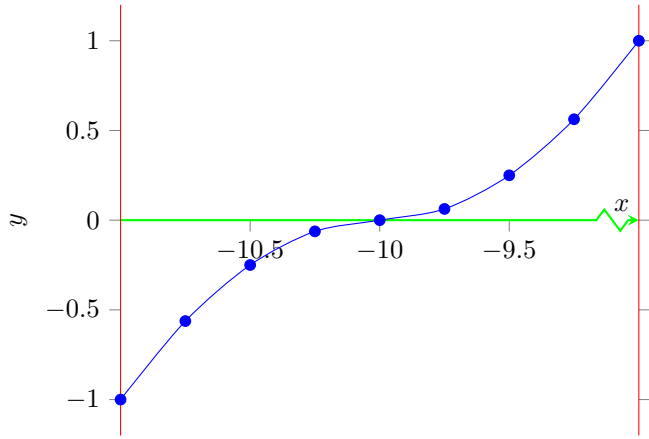
Separate lines - middle/box crunch parallel



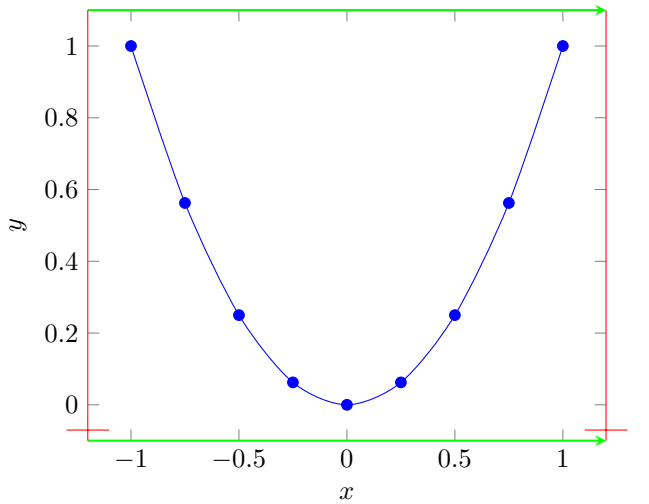
Separate lines - middle/box crunch



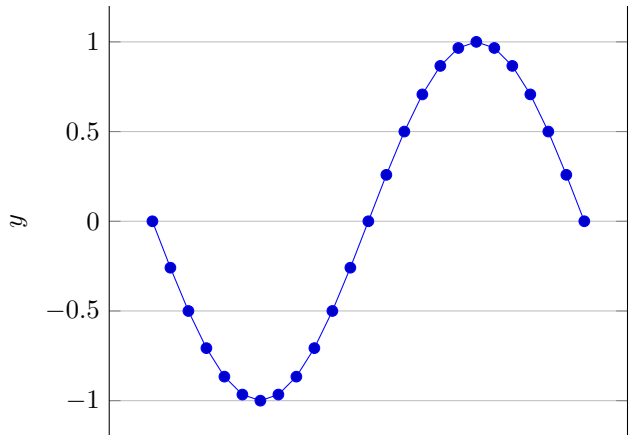
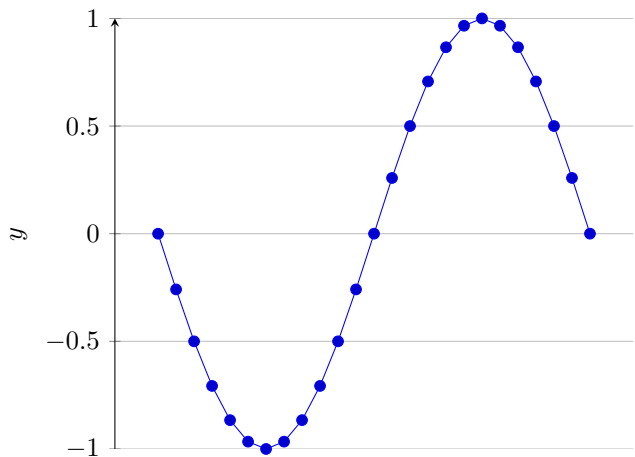
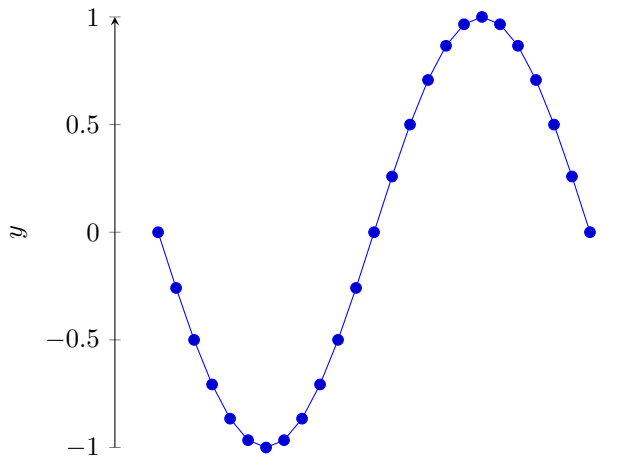
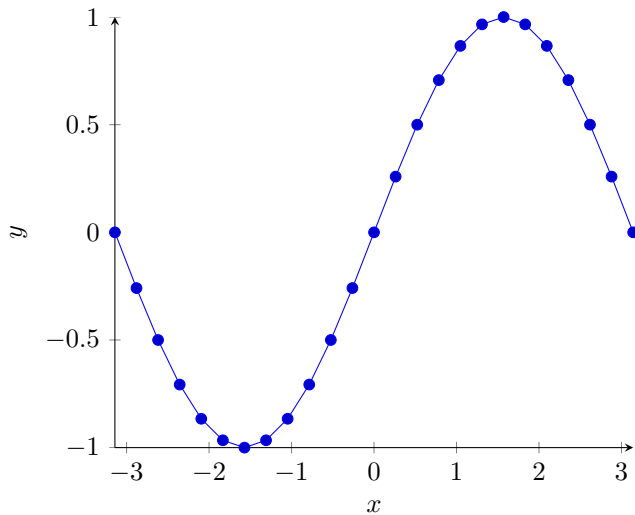
Separate lines - middle/box crunch parallel



7.2.5 Separate lines – axis y discontinuity



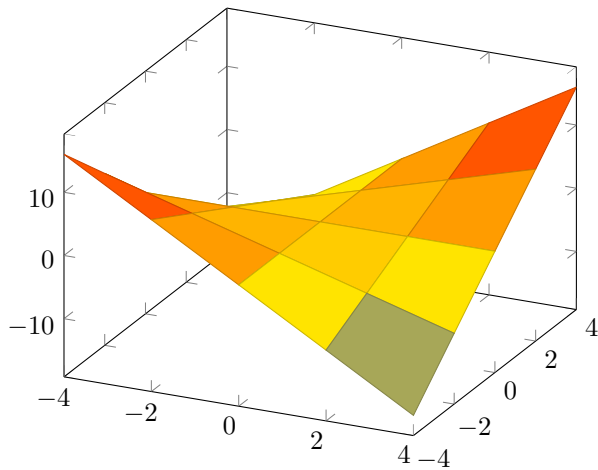
7.3 x line=none; – tick marks
shouldn't disappear



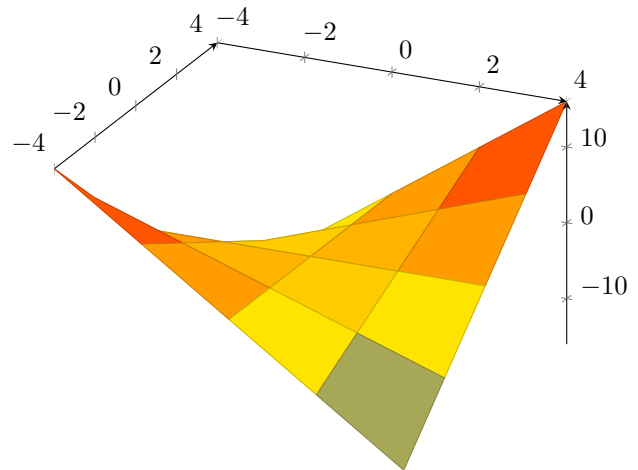
Chapter 8

pgfplotstest.axislines.3d.tex

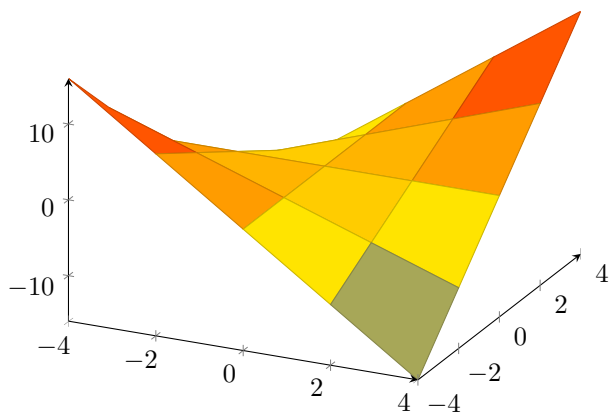
8.1 Boxed



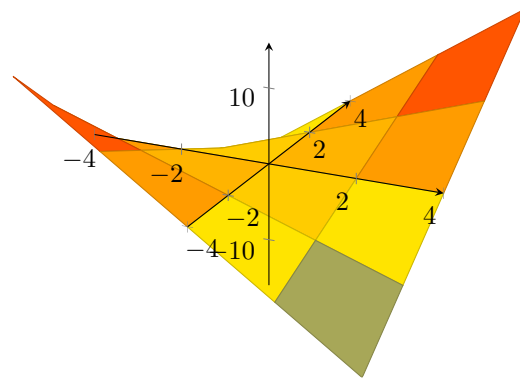
8.3 axis lines=right



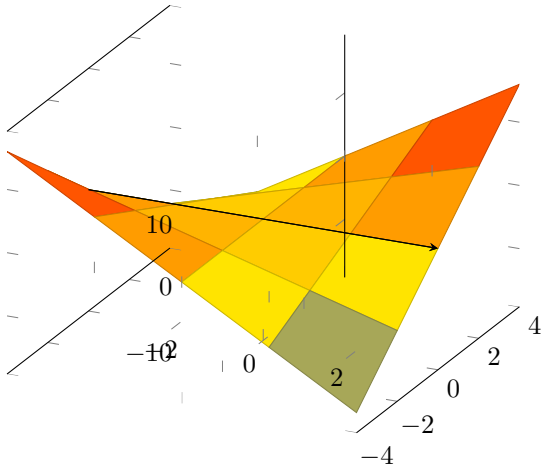
8.2 axis lines=left



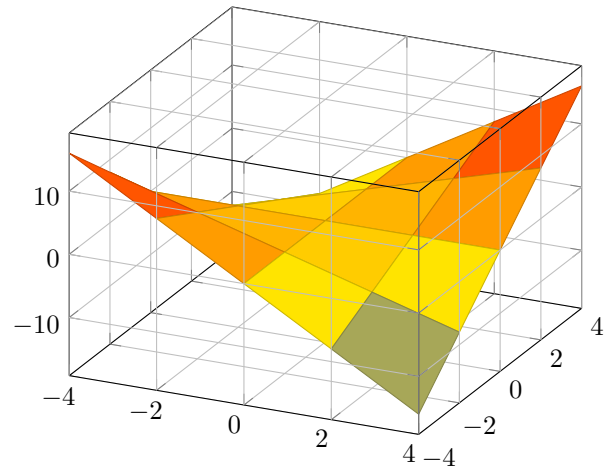
8.4 axis lines=middle,axis on top



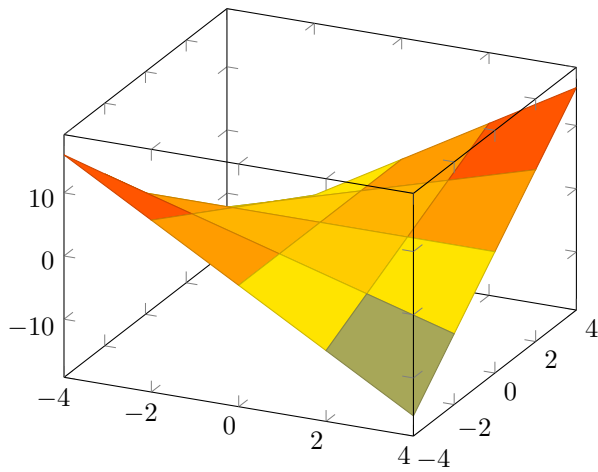
8.5 Only axis x line=middle



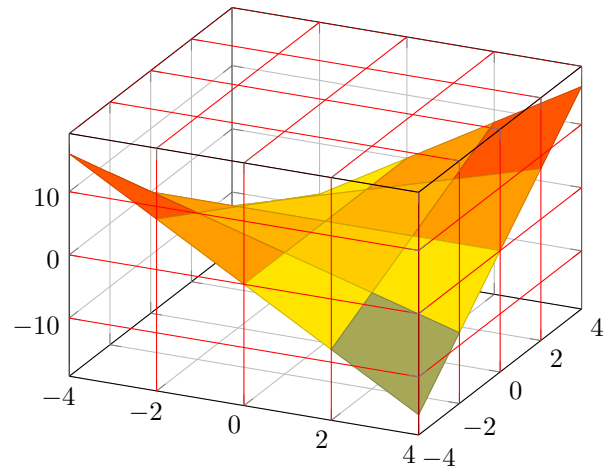
8.6.2 grid lines und completeSTAR



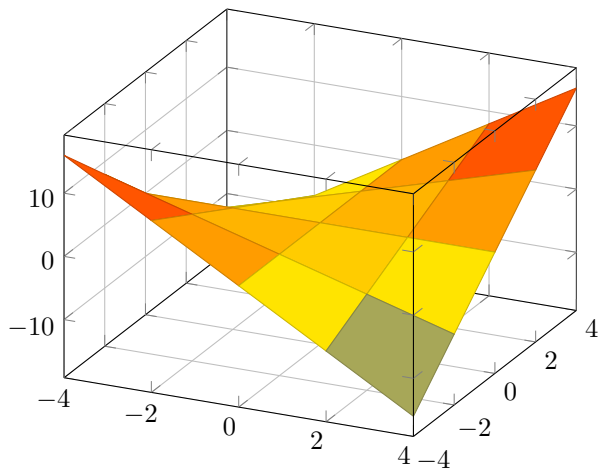
8.6 3d box=complete



8.6.3 grid lines und completeSTAR und styles



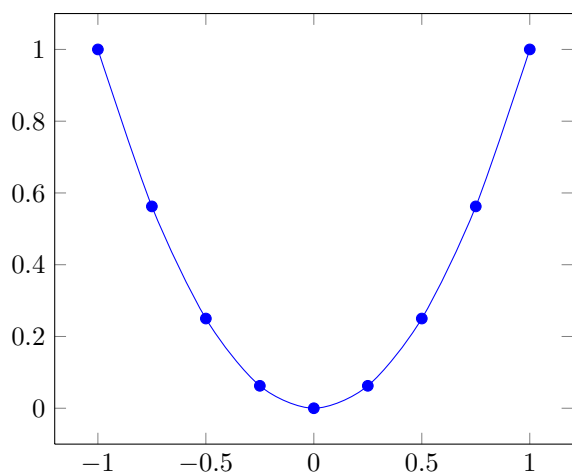
8.6.1 grid lines



Chapter 9

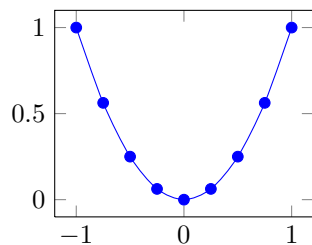
pgfplotstest.scaling.tex

9.1 Standard placement normal plot

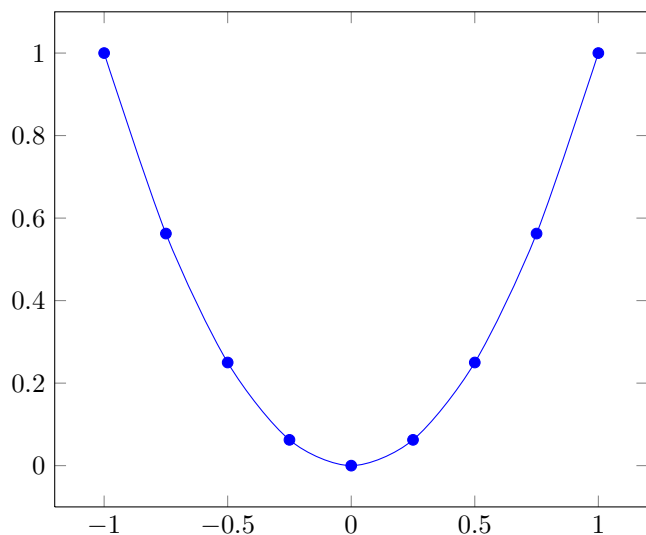


9.2 Scaling tests

9.2.1 width=5cm

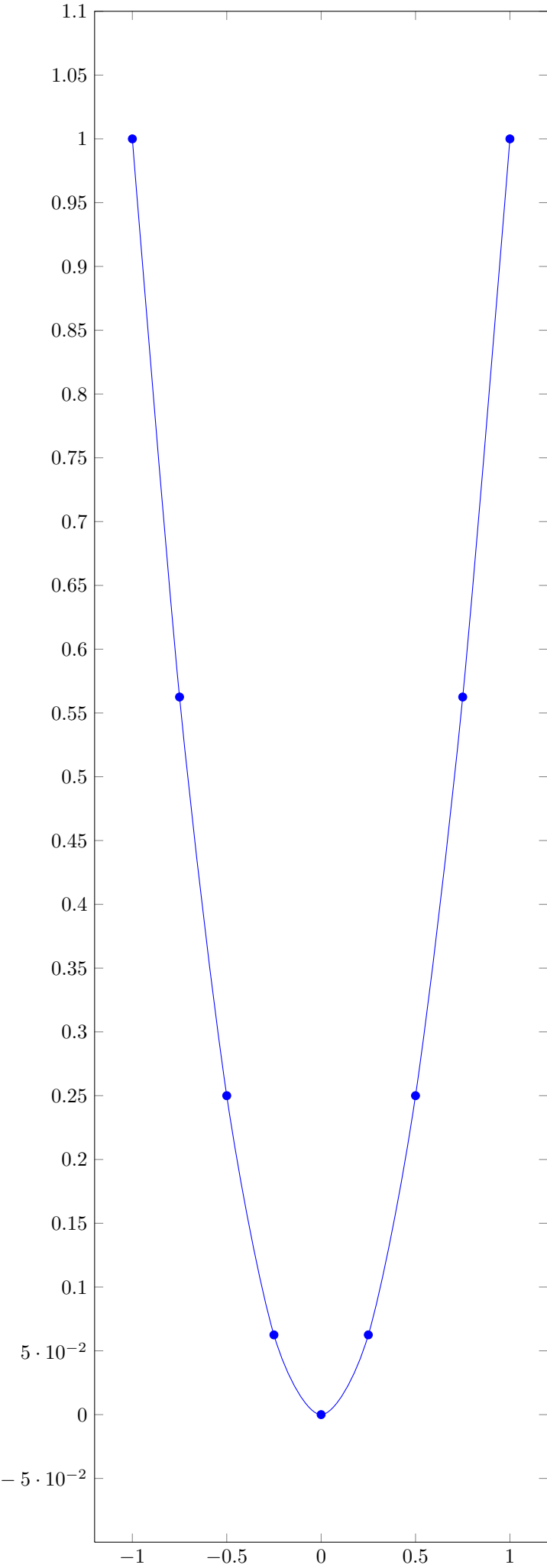


9.2.2 width=linewidth

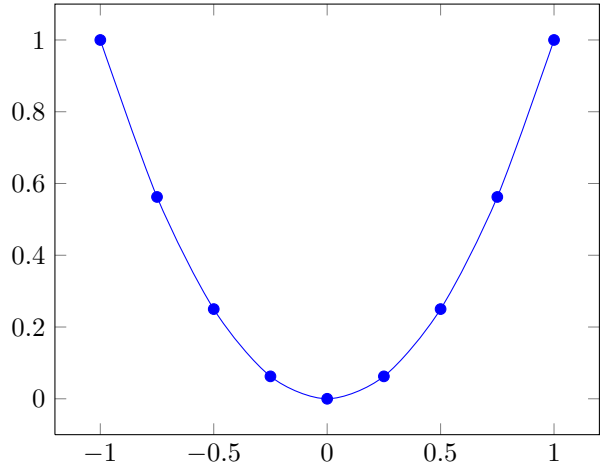


9.2.3 width=linewidth, height=textheight

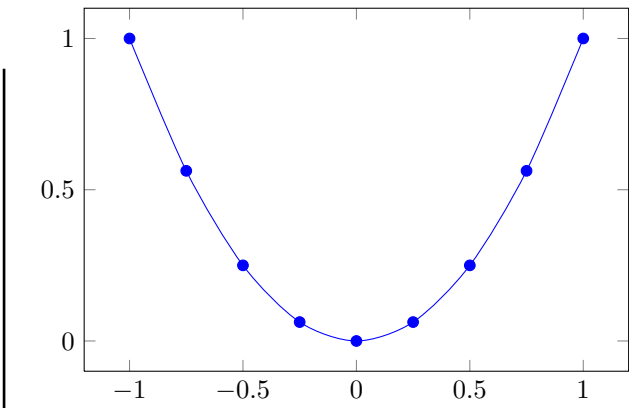
9.2.4 height=3cm



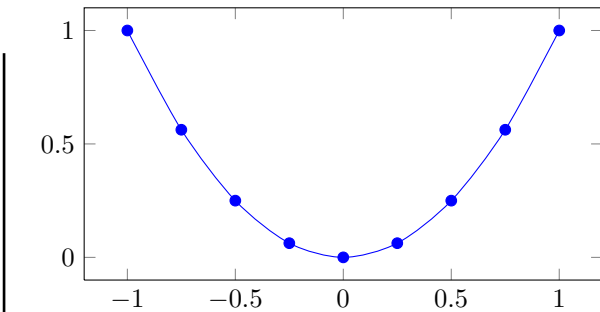
9.2.5 x=3cm



9.2.6 x=3cm, y=4cm



9.2.7 y=3cm



9.2.8 Scale vs. Datascale trafo

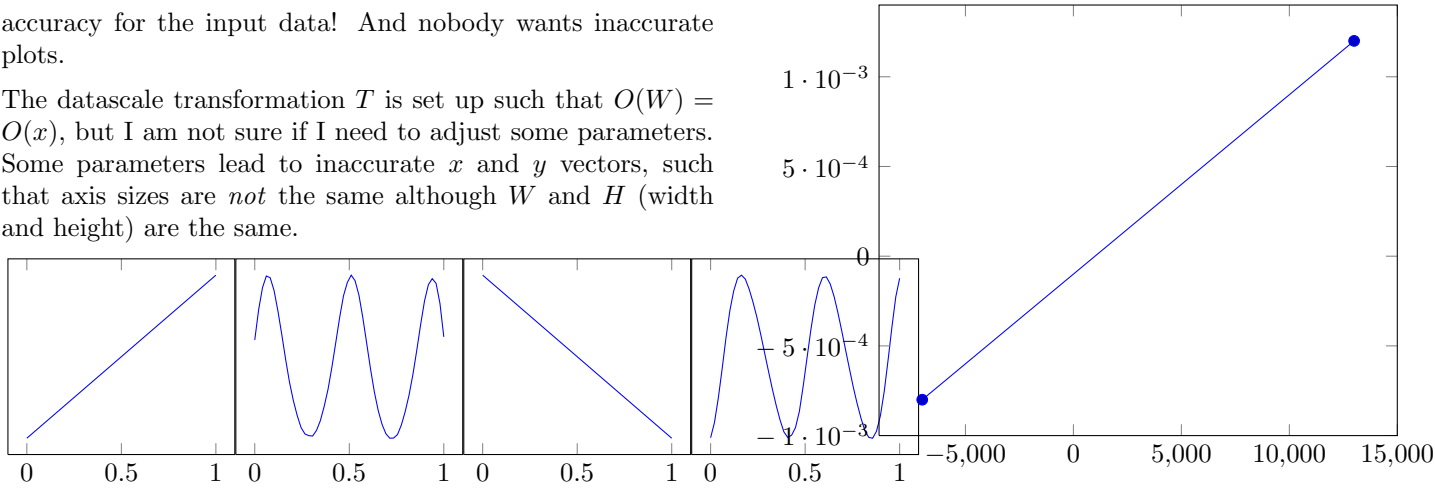
All should have the same size; especially the same height. This tests the data scale transformation and rounding inaccuracies during the computation of x and y unit vectors,

$$x = \frac{W}{T(\bar{x}) - T(\underline{x})}.$$

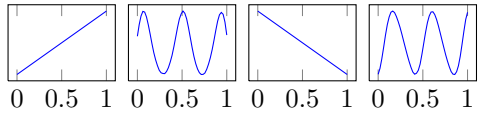
The larger x , the higher the scaling accuracy. Large x means small $T(\bar{x}) - T(\underline{x})$ (relative to width W). But this implies low

accuracy for the input data! And nobody wants inaccurate plots.

The datascale transformation T is set up such that $O(W) = O(x)$, but I am not sure if I need to adjust some parameters. Some parameters lead to inaccurate x and y vectors, such that axis sizes are *not* the same although W and H (width and height) are the same.

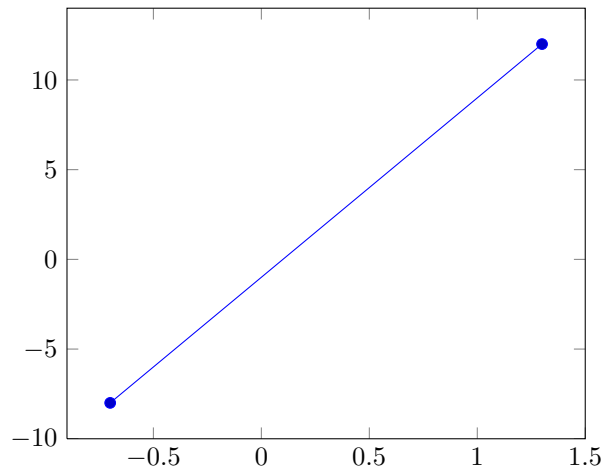
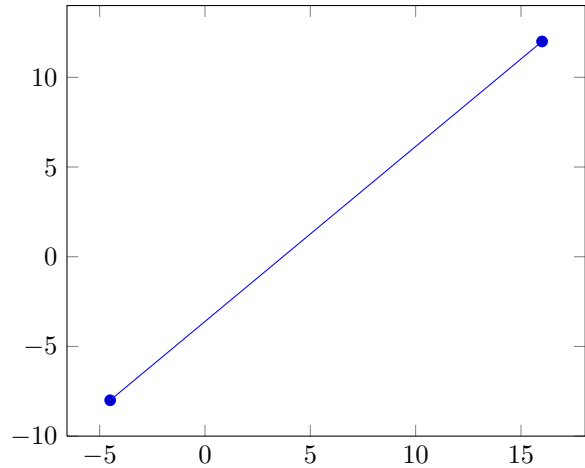


once more again without ‘scale only axis’:

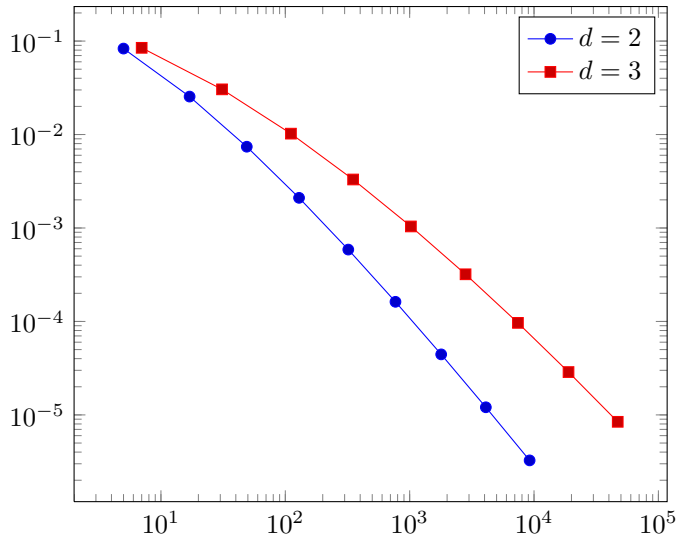


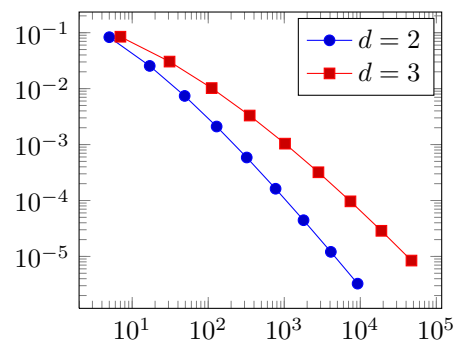
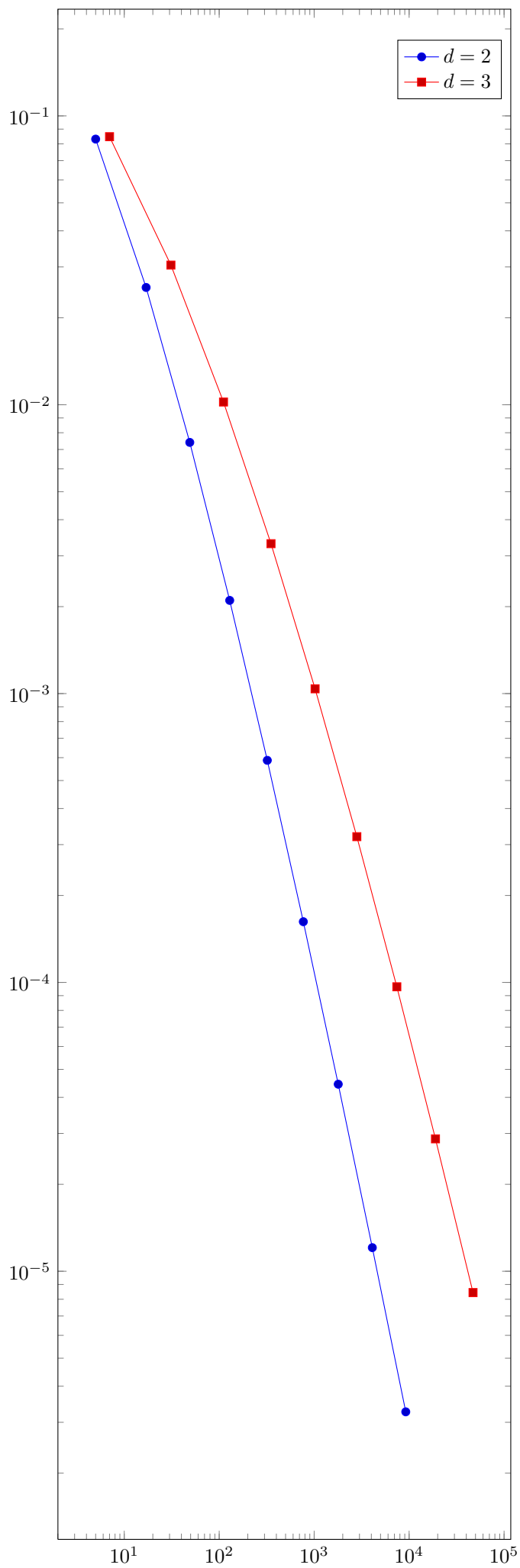
9.2.9 Testing numeric artefacts around tick position ‘0’

[scaled ticks=false] in this subsection



9.3 Scaling log plots



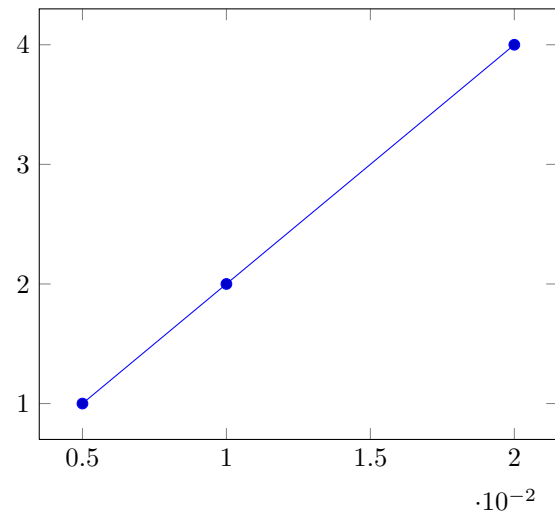


9.4 Scaletest

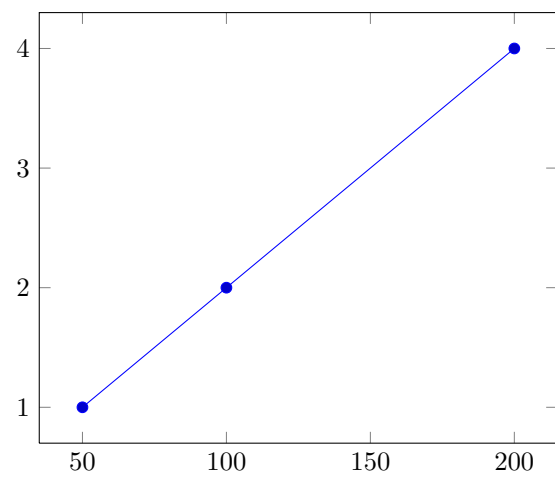


9.5 Scaling test for very small or very large x values

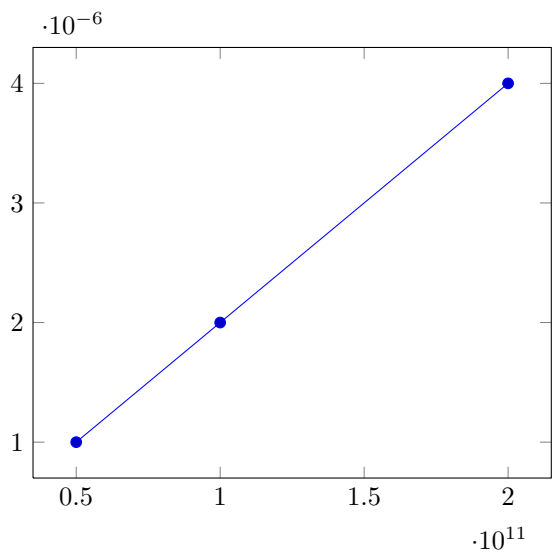
9.5.1 1e-2



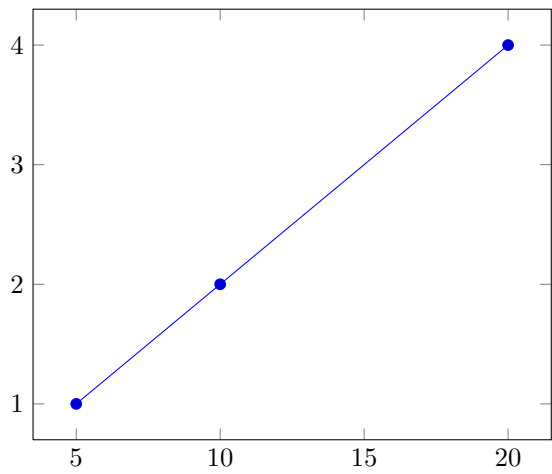
9.5.2 1e+2



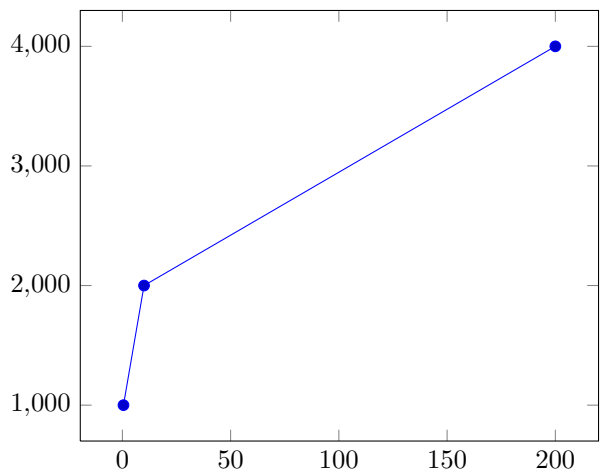
9.5.3 $x=1e+11; y=1e-6$



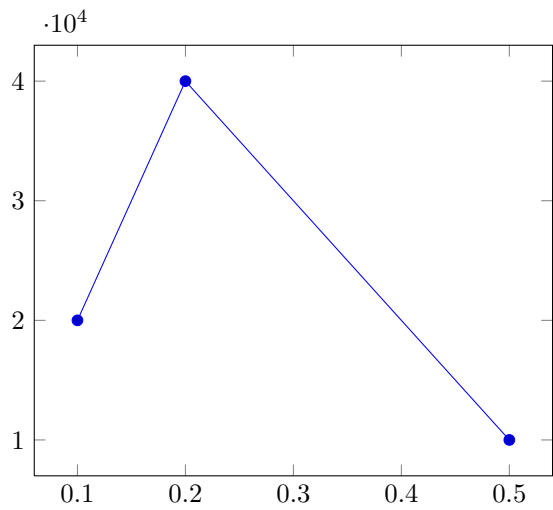
9.5.4 $1e+1$



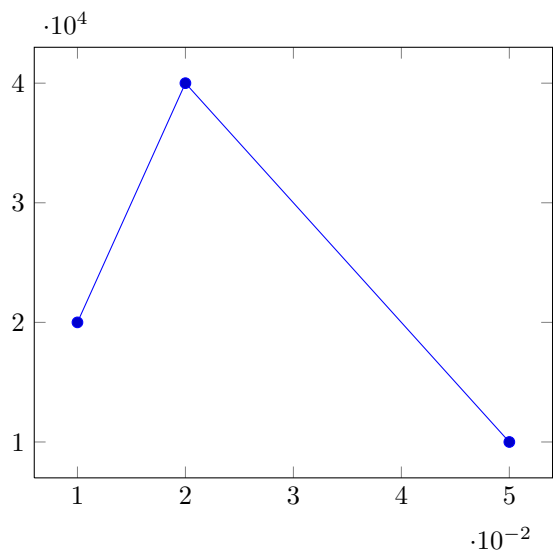
9.5.5 $1e+3$



9.5.6 $1e+4$



9.5.7 $1e-2, 1e+4$



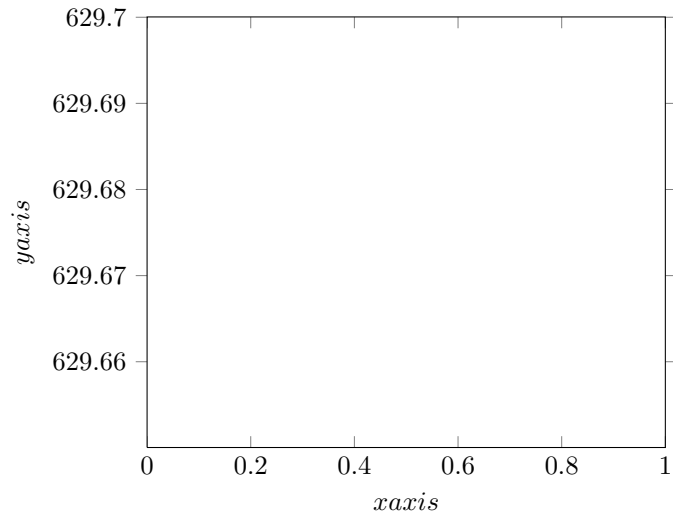
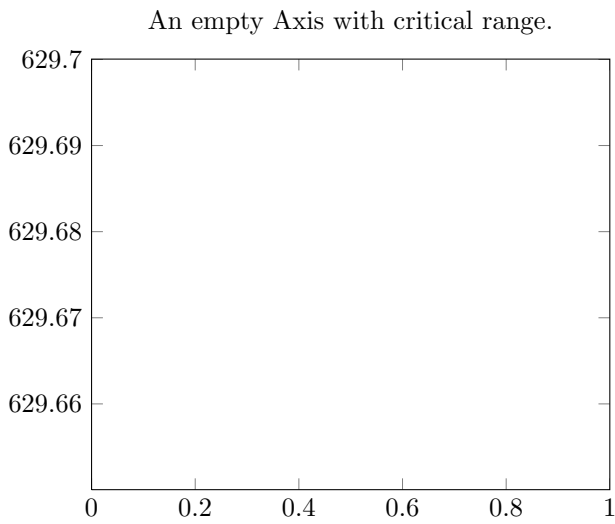
Chapter 10

pgfplotstest.ticks.tex

10.1 Ticks for very small data range vs Datascaletrafo

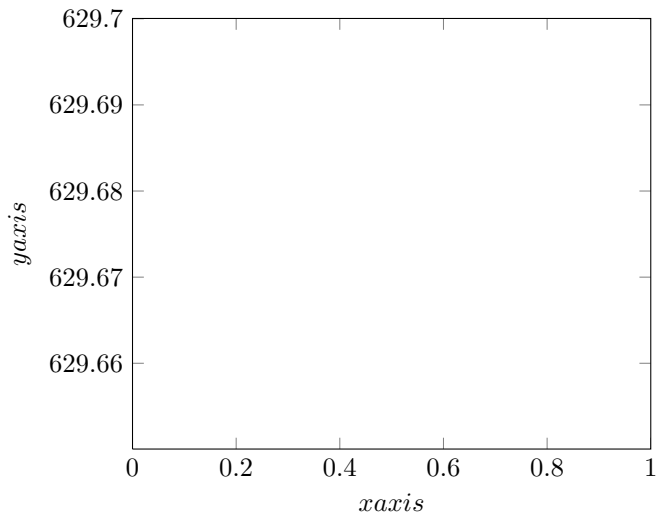
10.2.2 xtick align=inside, align=outside ytick

10.1.1 Critical Range in y

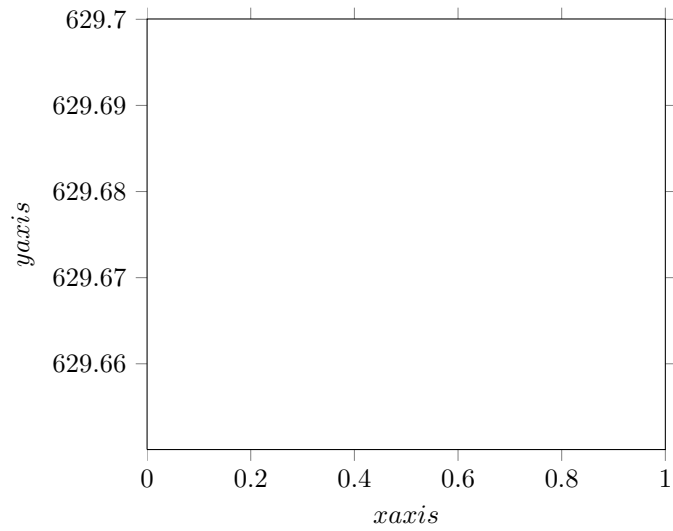


10.2 Tick align

10.2.1 xtick align=inside, ytick align=inside

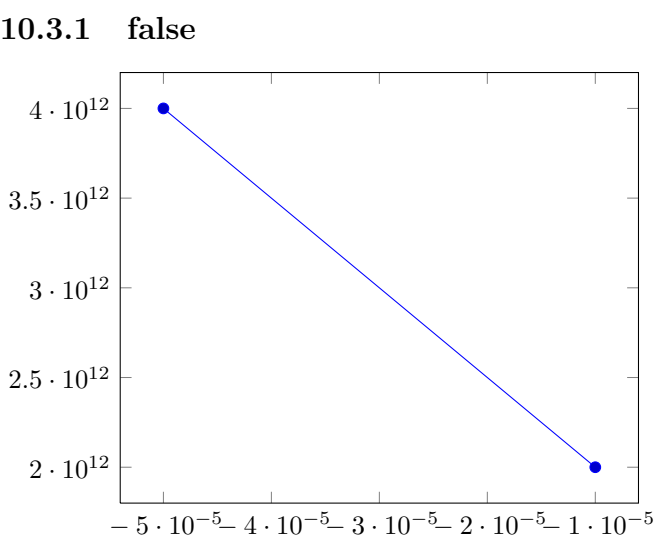
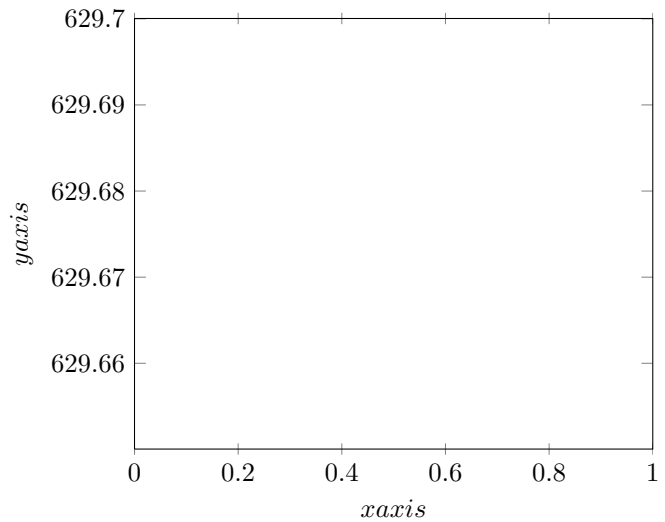


10.2.3 xtick align=outside, align=outside ytick

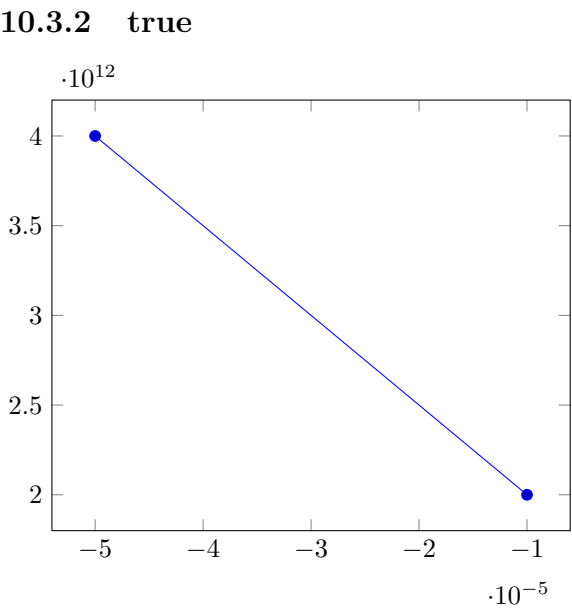
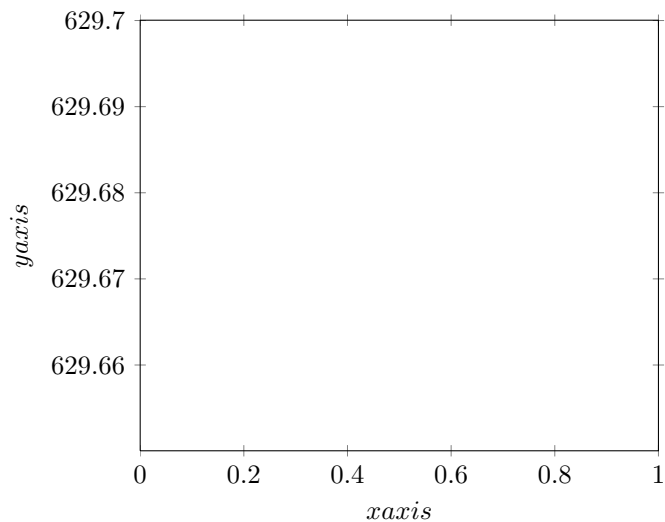


10.2.4 `xtick align=center, ytick align=inside`

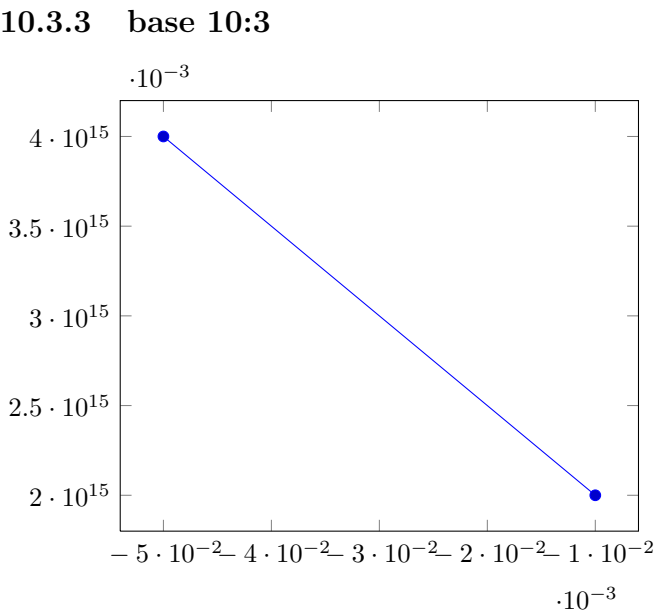
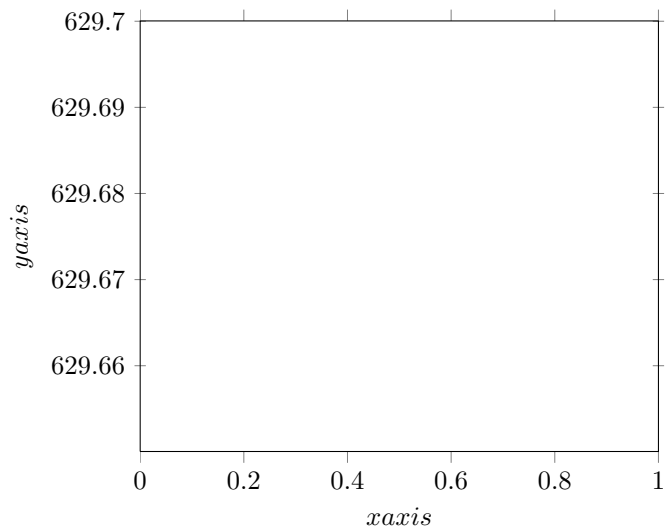
10.3 Scaled ticks



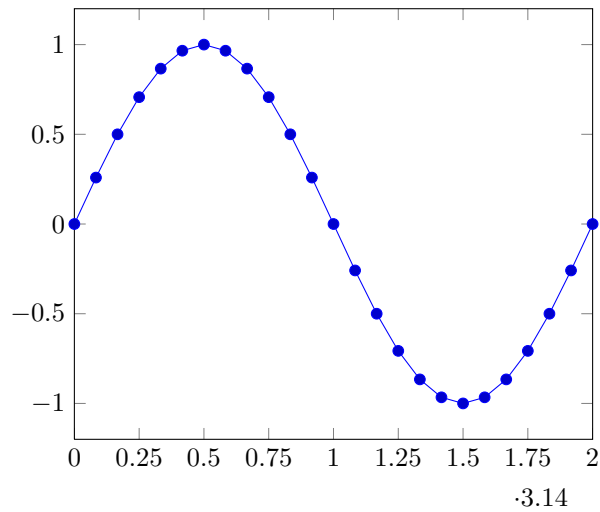
10.2.5 `xtick align=center, ytick align=center`



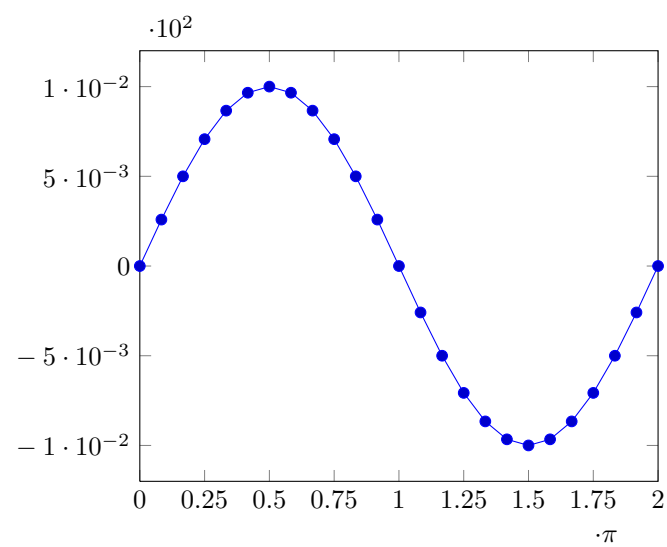
10.2.6 `xtick align=outside, ytick align=center`



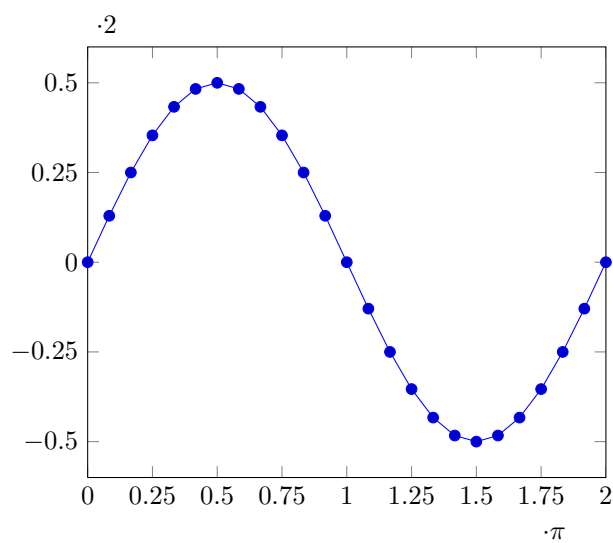
10.3.4 real:3.1415



10.3.5 real:3.1415 und y = base 10:-2

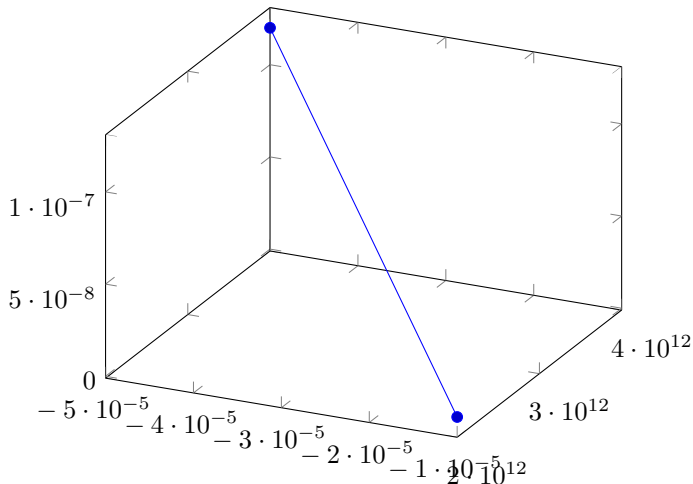


10.3.6 real:3.1415 und y = real:2

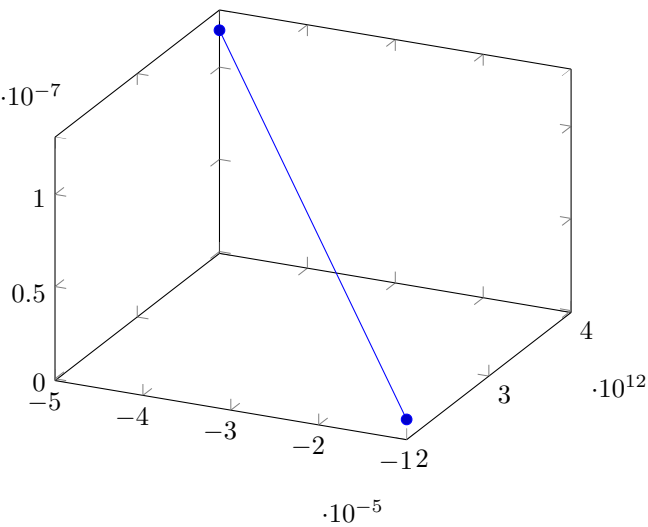


10.4 Scaled Ticks 3D

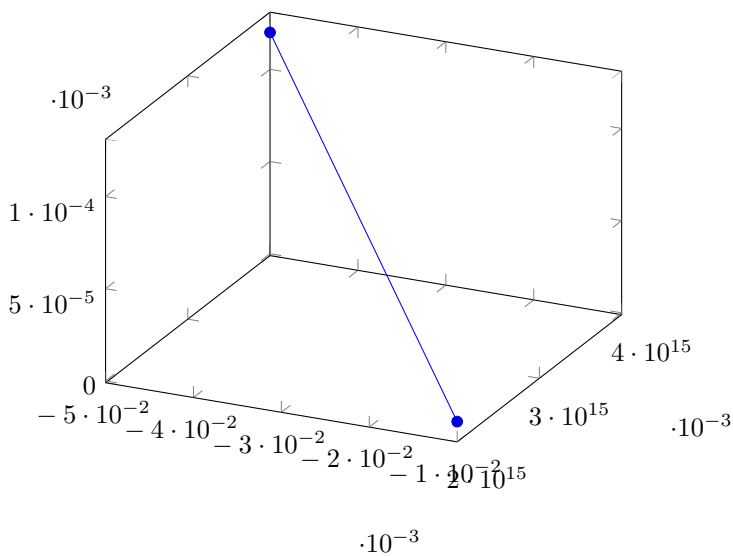
10.4.1 false



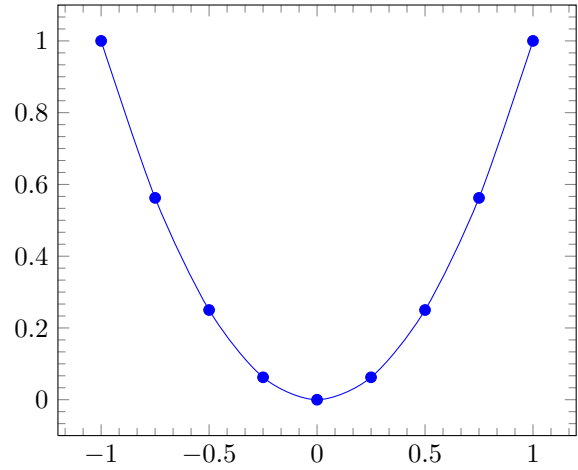
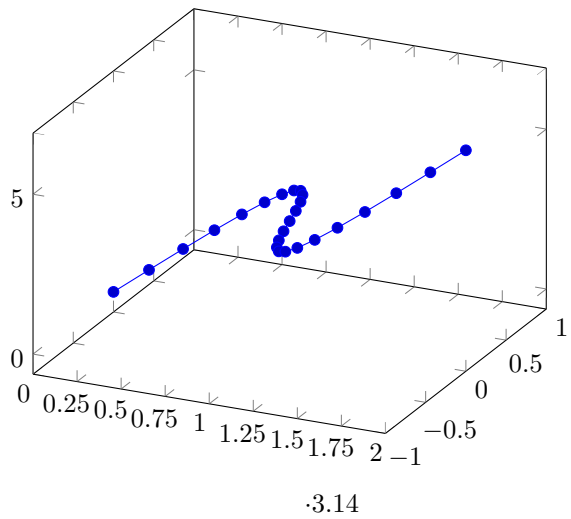
10.4.2 true



10.4.3 base 10:3

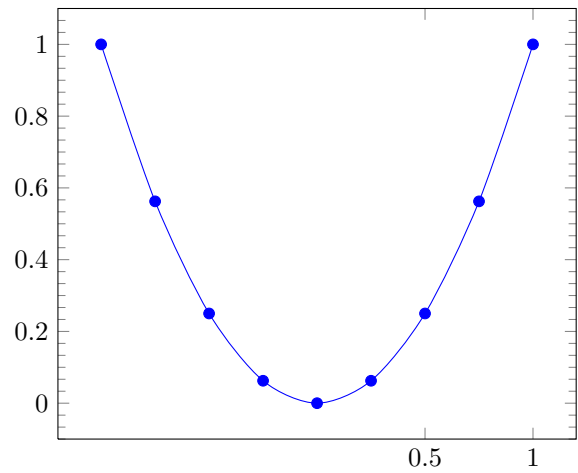
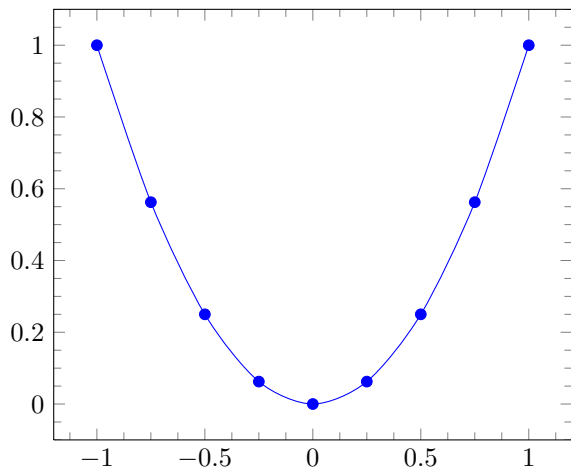


10.4.4 real:3.1415

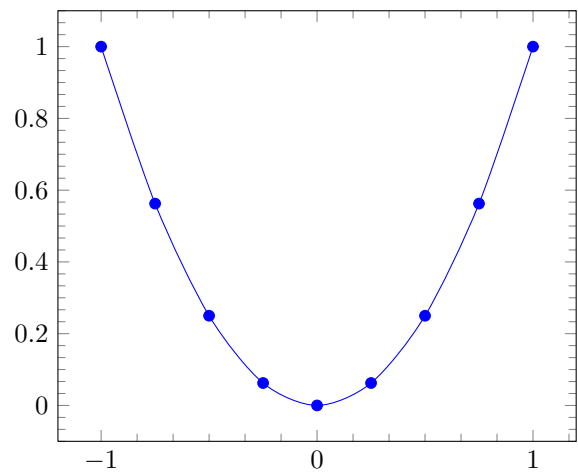
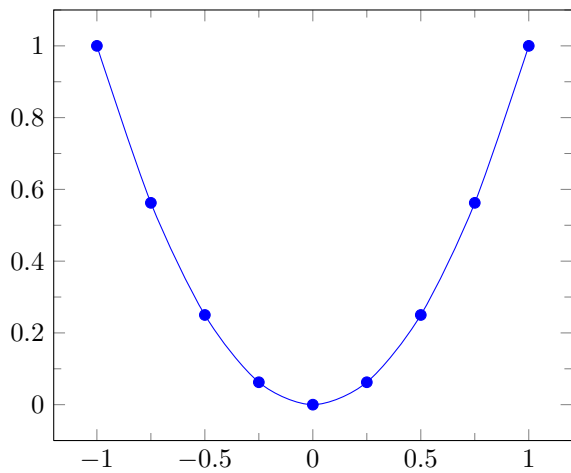


10.5.1 + Explicit tick marks (non-uniform)

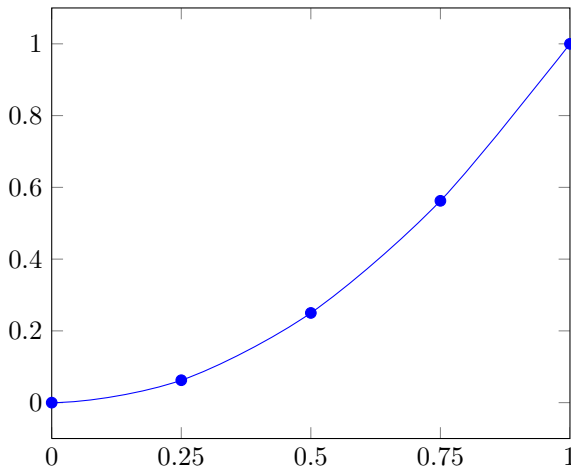
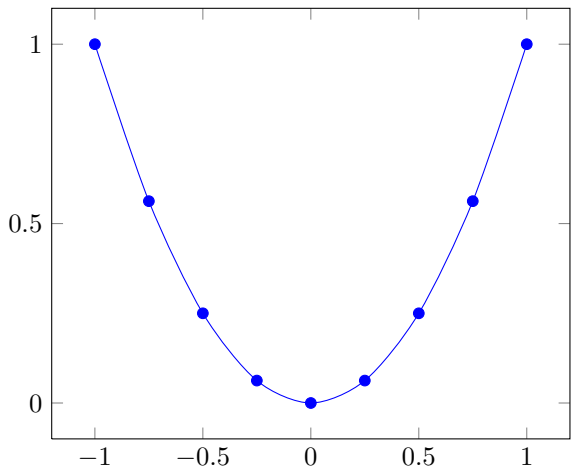
10.5 Minor ticks



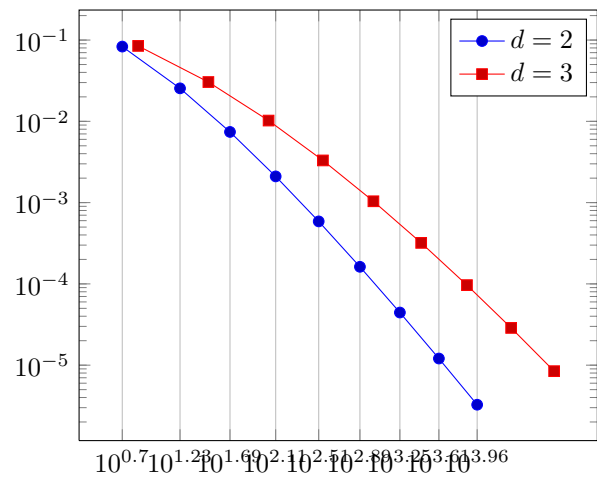
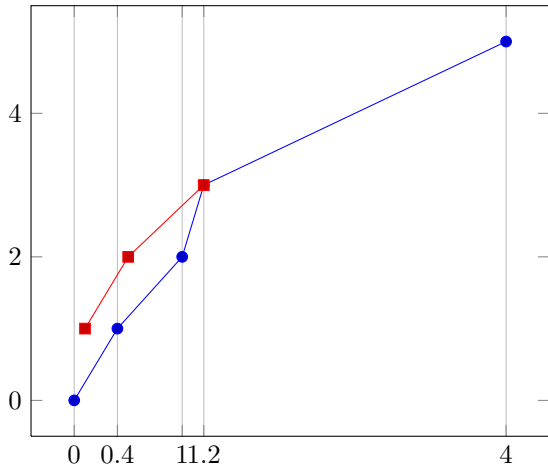
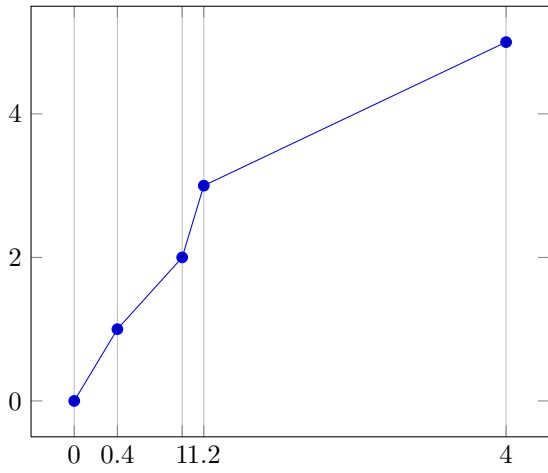
10.5.2 + Explicit tick marks (uniform)



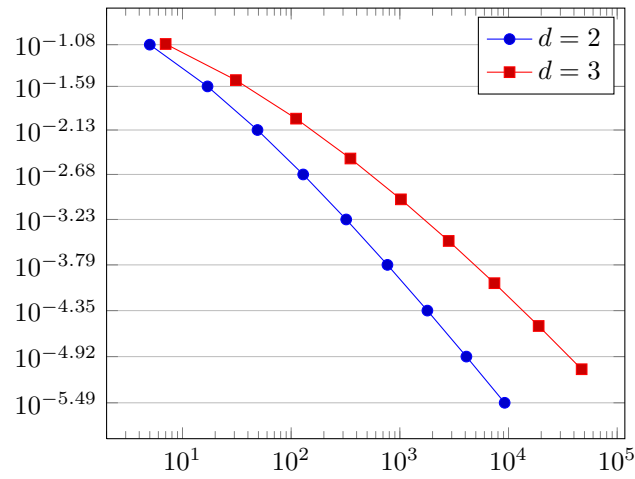
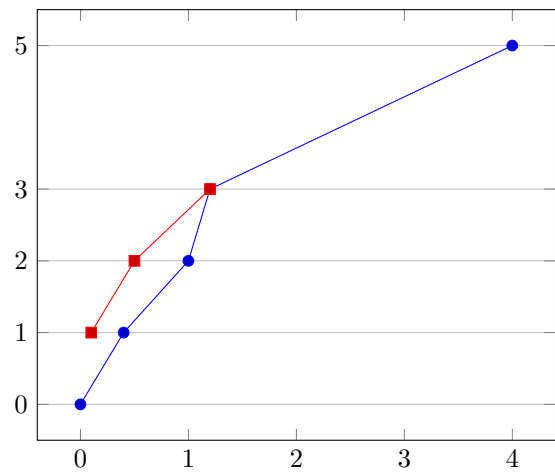
10.6 Tick placement



10.6.1 xtick=data

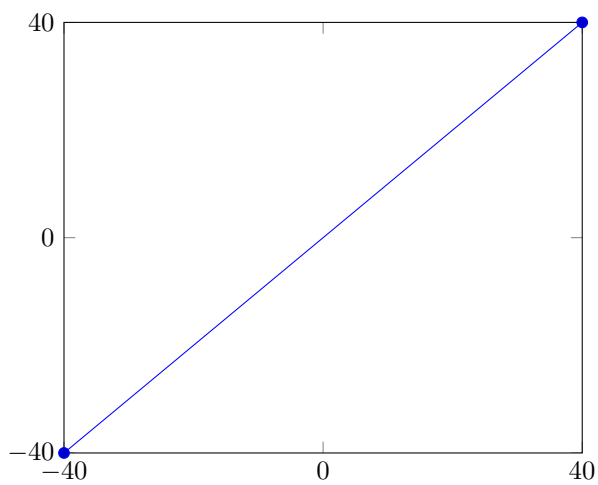
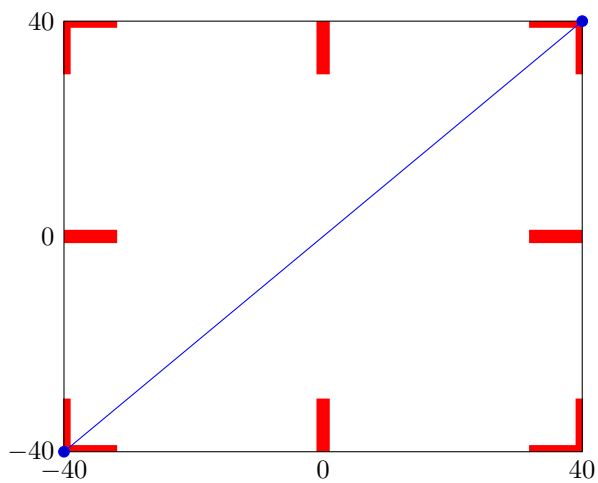
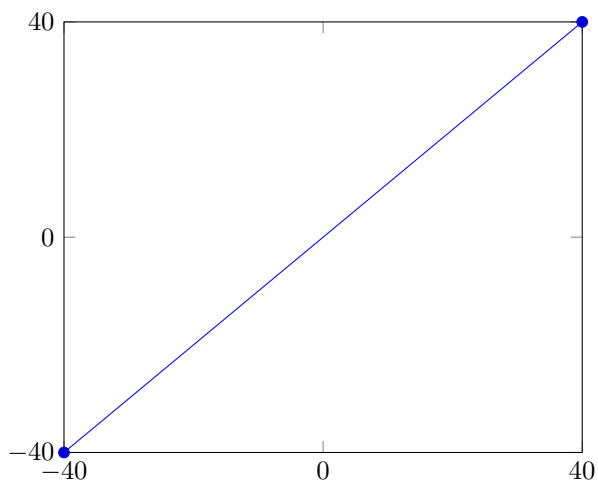


ytick=data

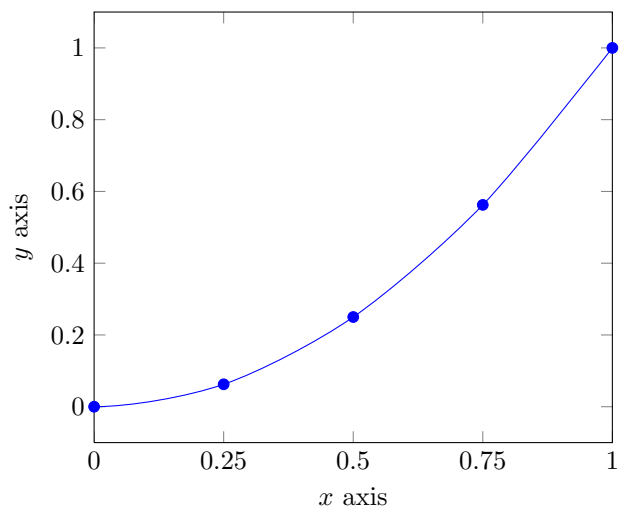
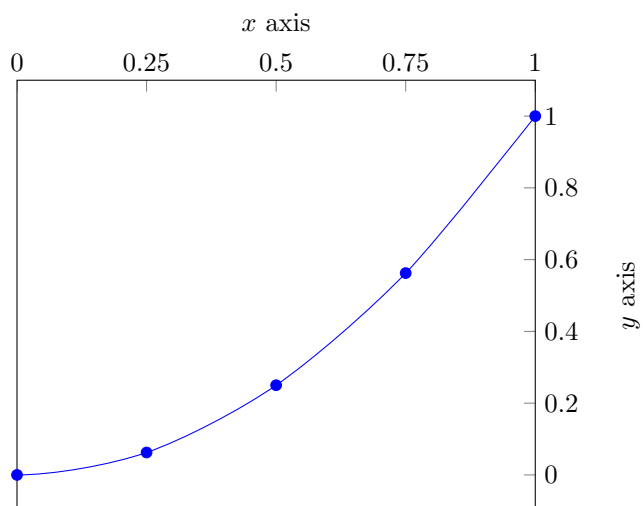


10.6.2 ticks on axis rectangle

First plot: default tick style; second plot: red, third: 'help lines'

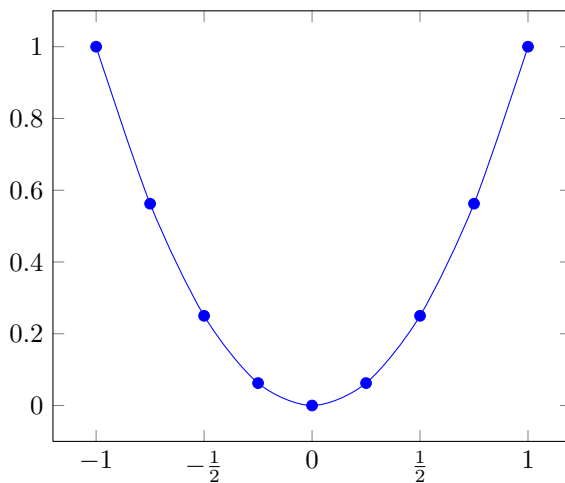


10.6.3 modified labels

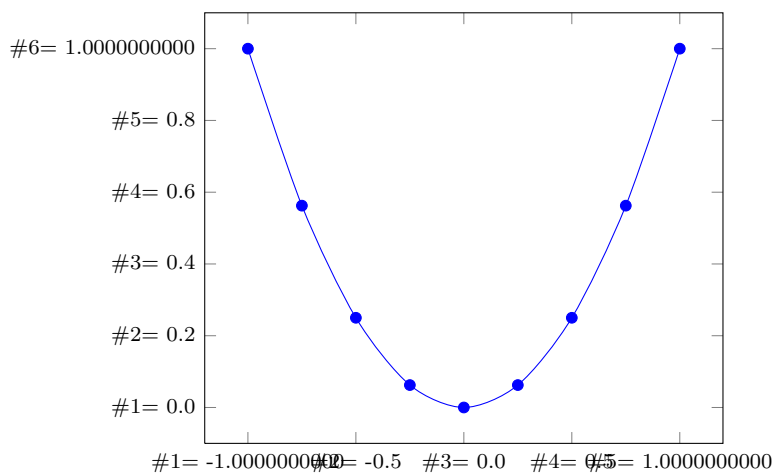


10.7 Tick label assignment tests

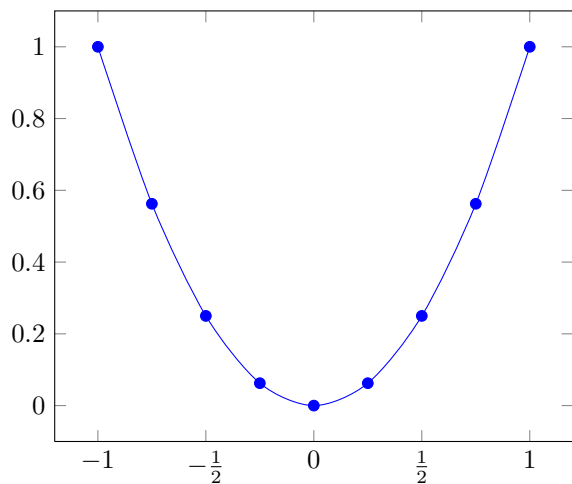
10.7.1 Using xticklabel and xtick



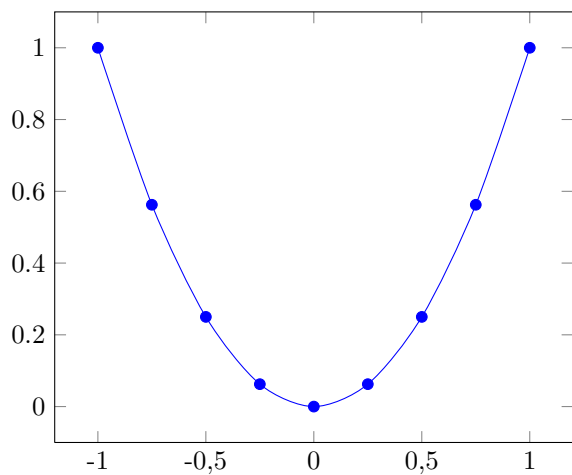
10.7.2 Showing ticknum verbatim



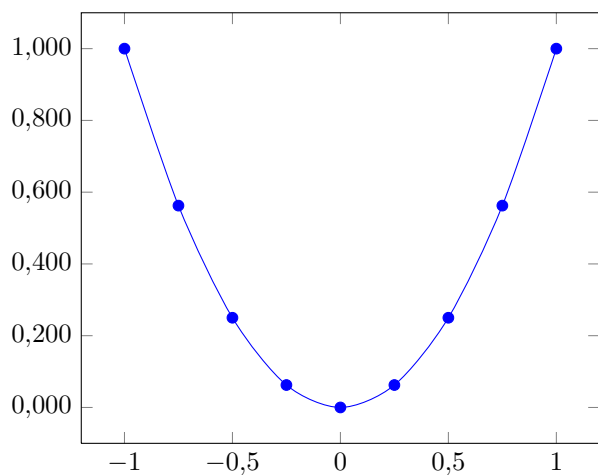
10.7.3 Using xticklabels



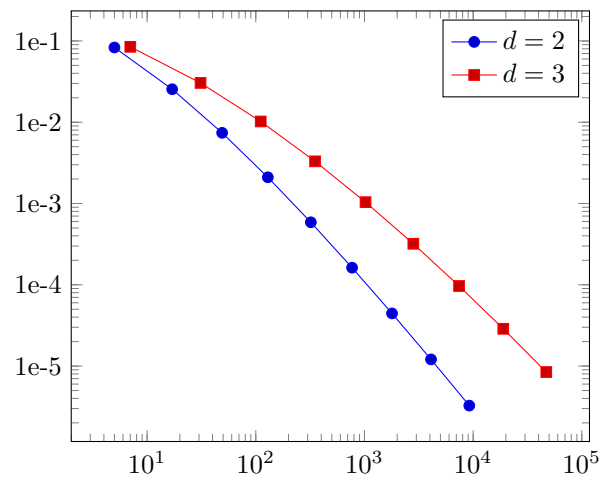
10.7.4 With xtick labels and commas by hand



10.7.5 Only with auto number formatting options; different for x and y

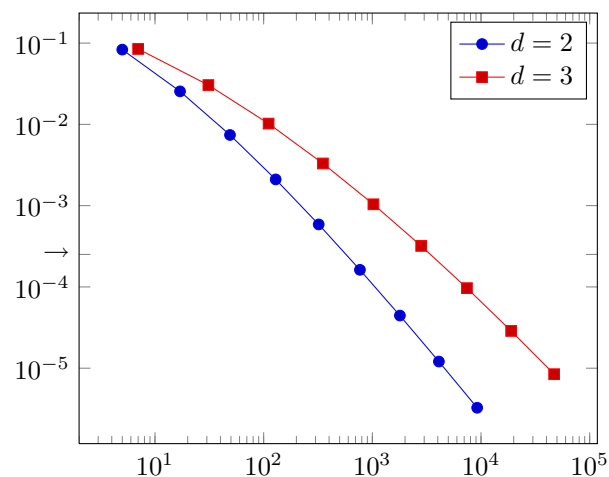


10.7.6 Using yticklabels in logplot

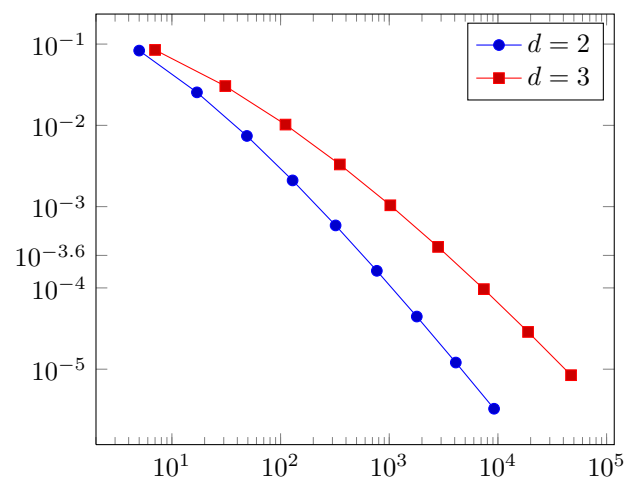


10.8 Tick/Tick-Label placement log plots

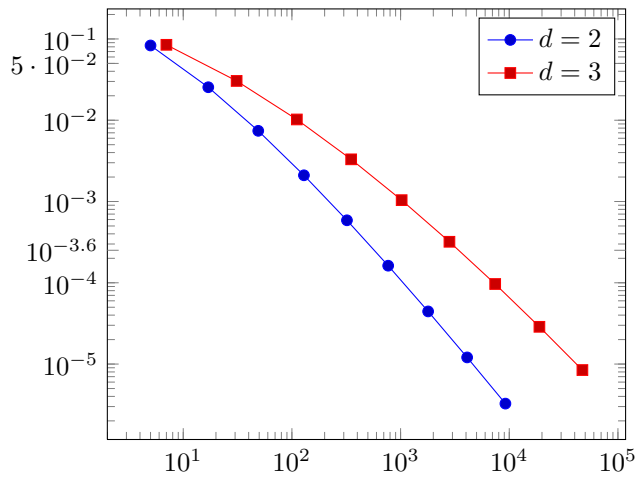
10.8.1 ytickten



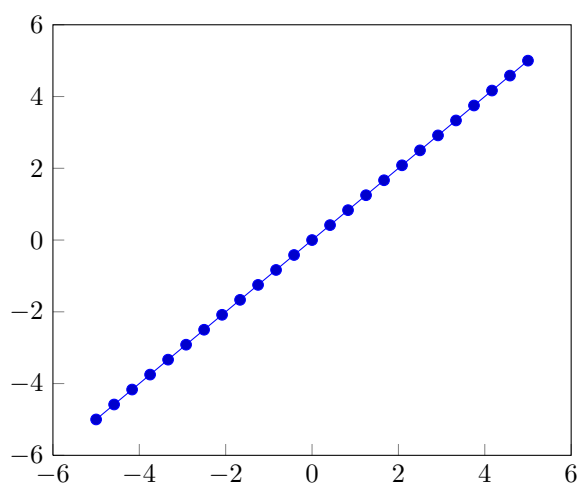
10.8.2 ytick



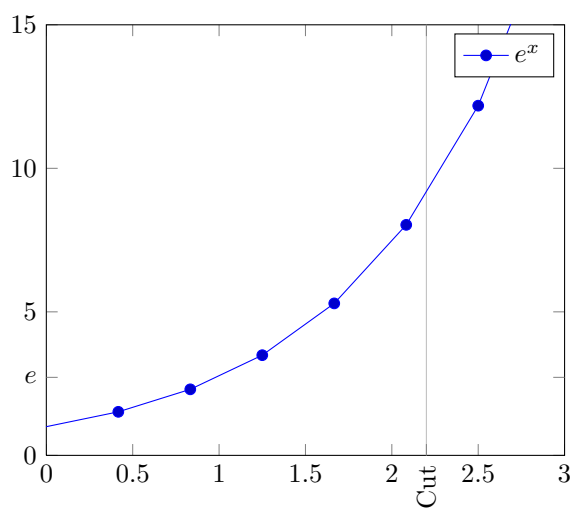
10.8.3 extra y ticks



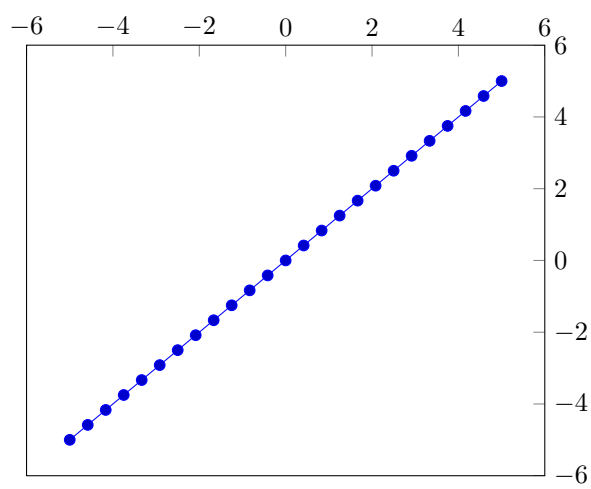
tick pos=left



10.8.4 extra x and y ticks, linear plot



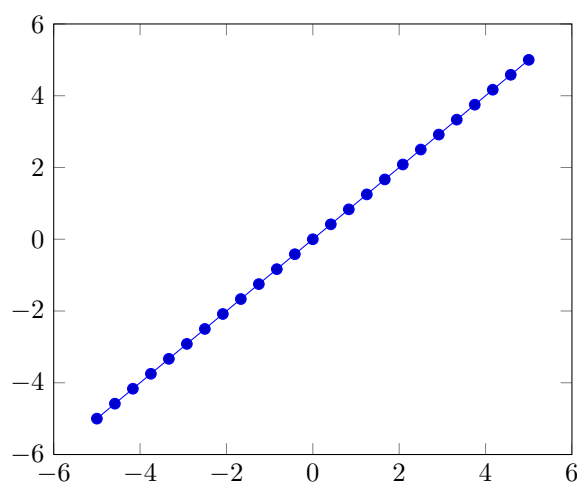
tick pos=right



10.9 tick pos

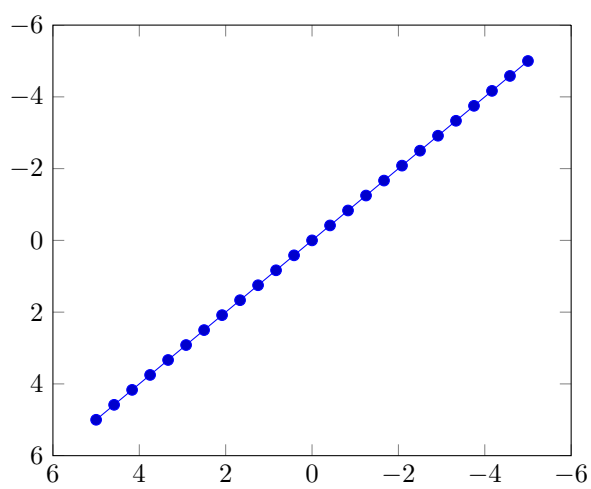
10.9.1 Standard

tick pos=both

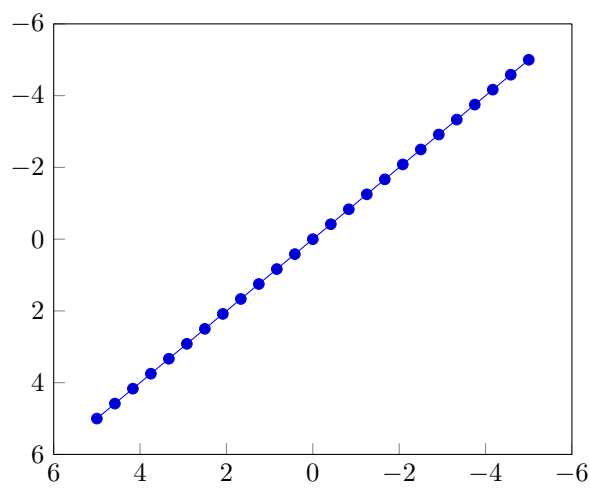


10.9.2 Reversed axes

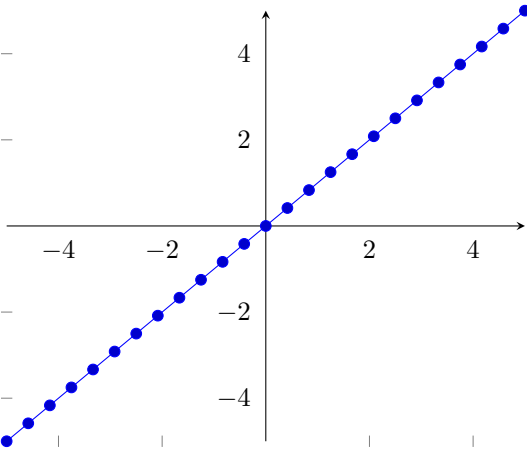
tick pos=both



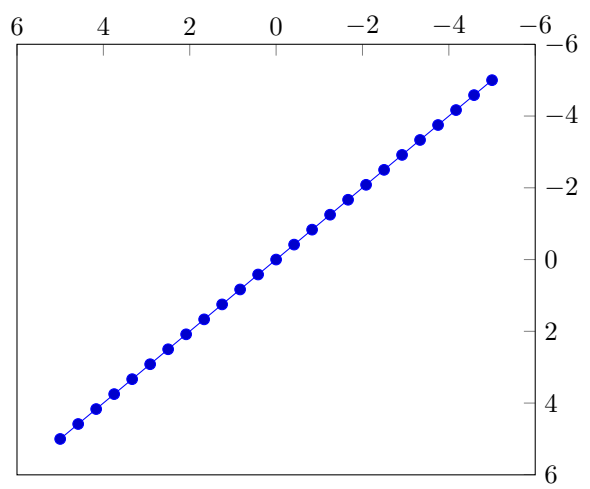
tick pos=left



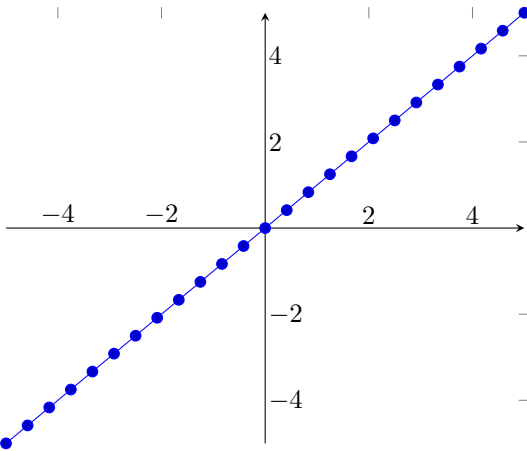
tick pos=left



tick pos=right

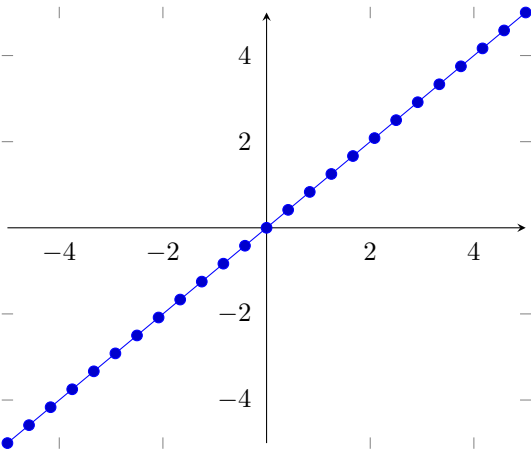


tick pos=right



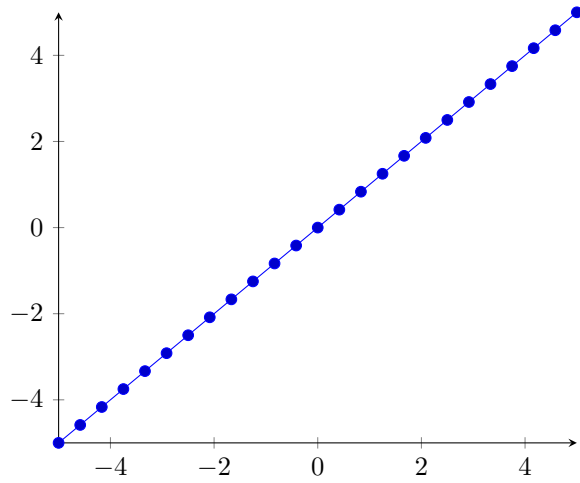
10.9.3 axis lines =center

tick pos=both

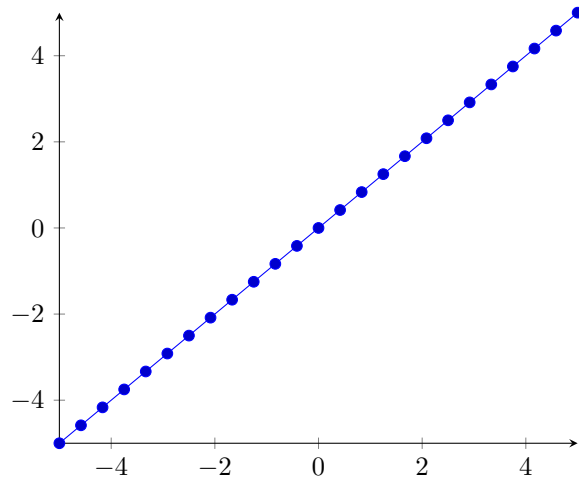


10.9.4 axis lines =left

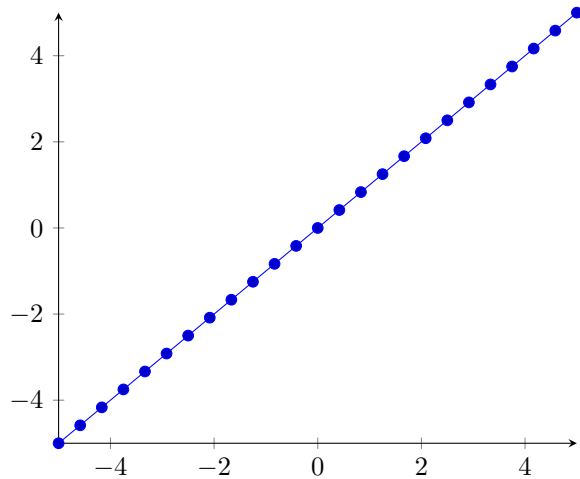
tick pos=both



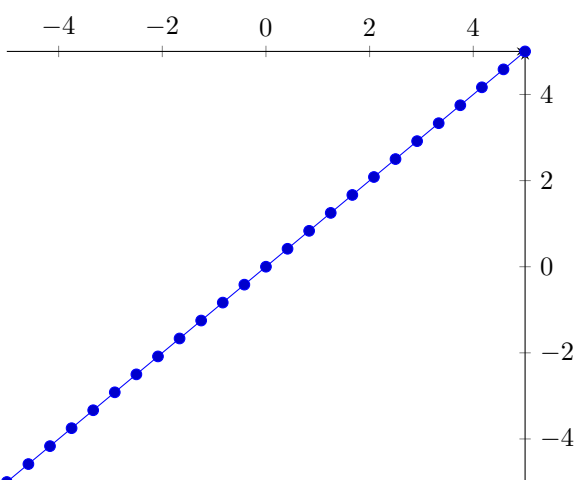
tick pos=left



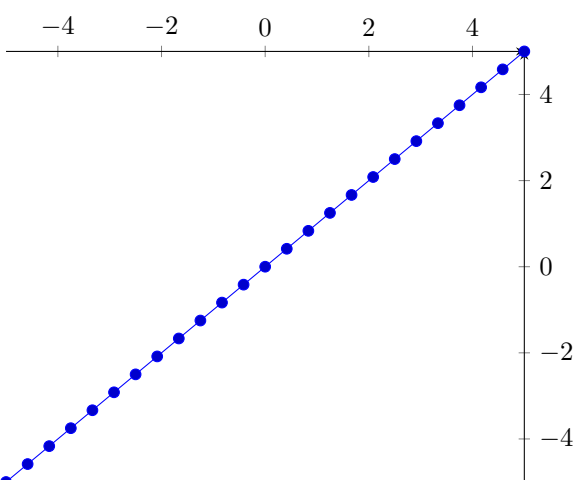
tick pos=left



tick pos=right

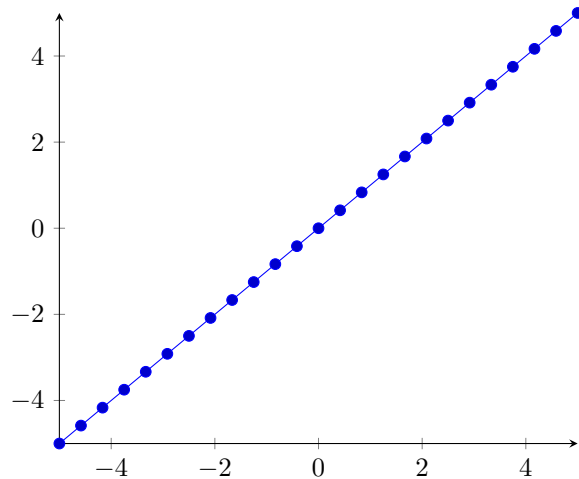


tick pos=right



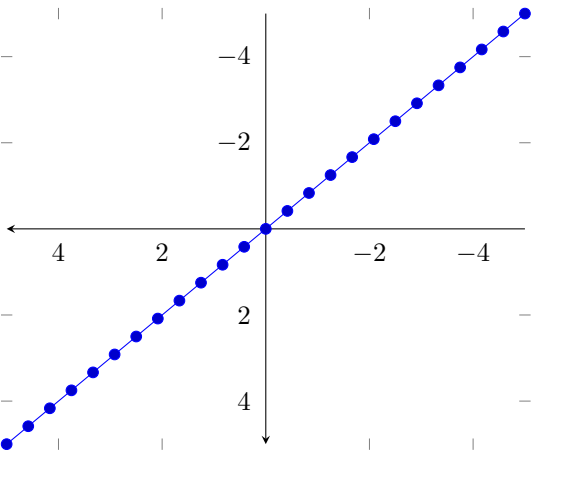
10.9.5 axis lines =right

tick pos=both

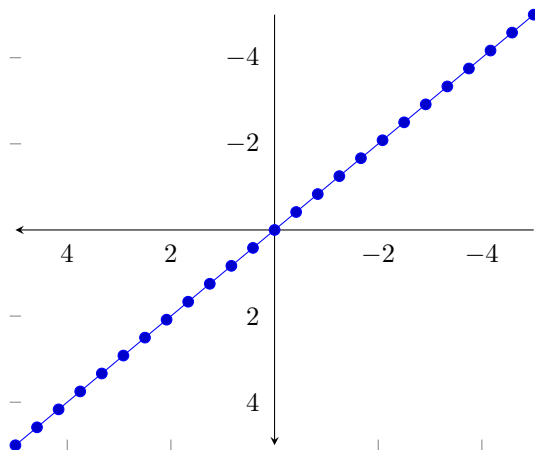


10.9.6 reversed axes and axis lines =center

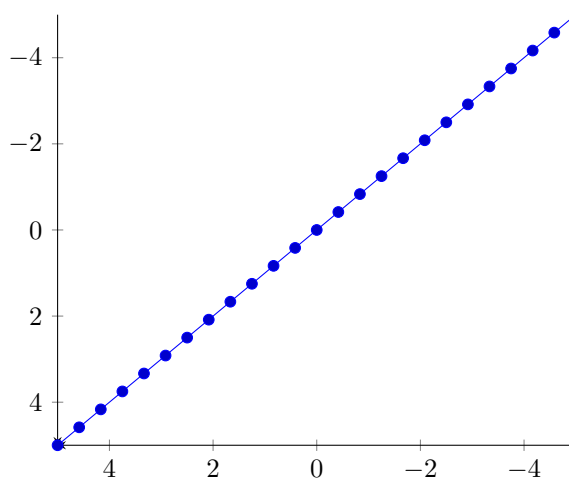
tick pos=both



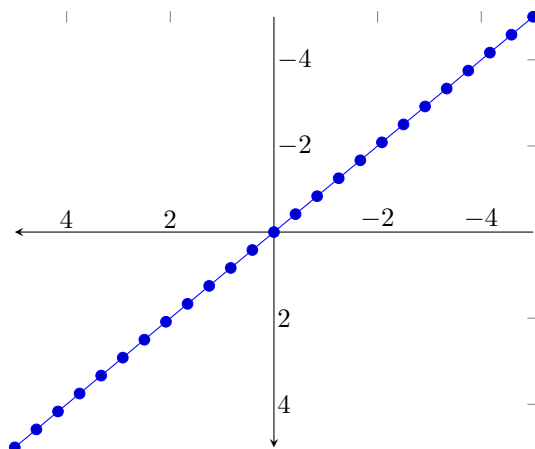
tick pos=left



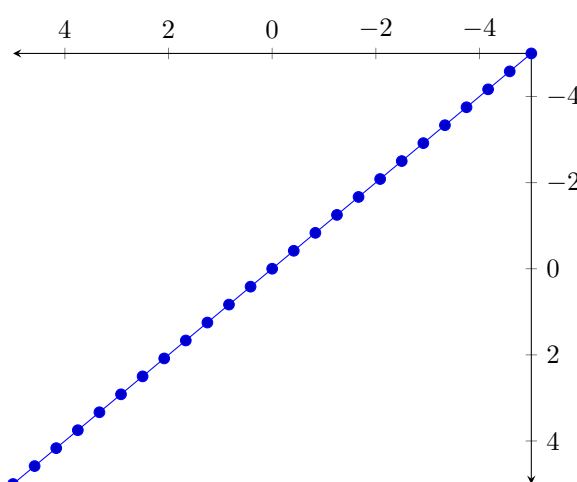
tick pos=left



tick pos=right

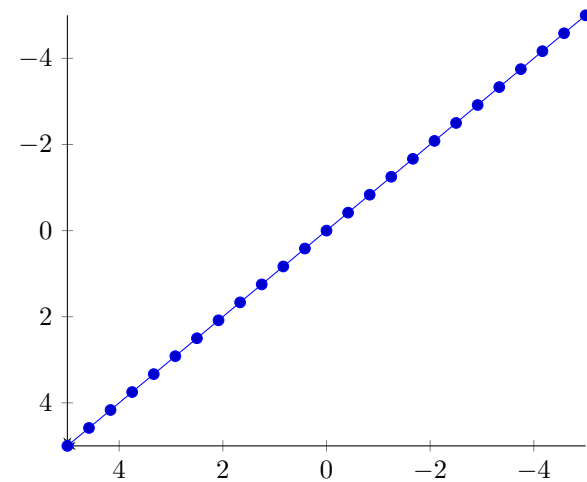


tick pos=right



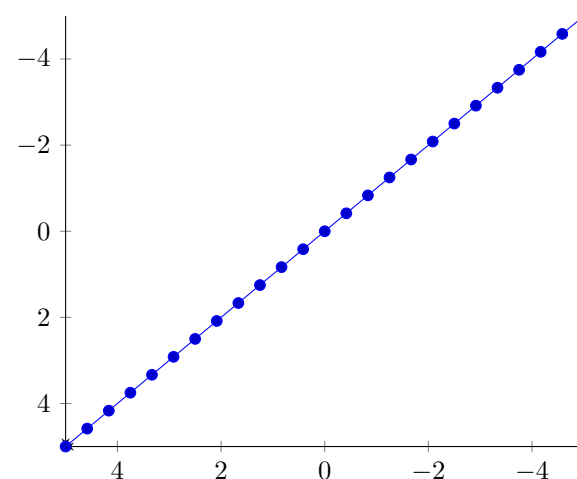
10.9.7 reversed axes and axis lines =left

tick pos=both

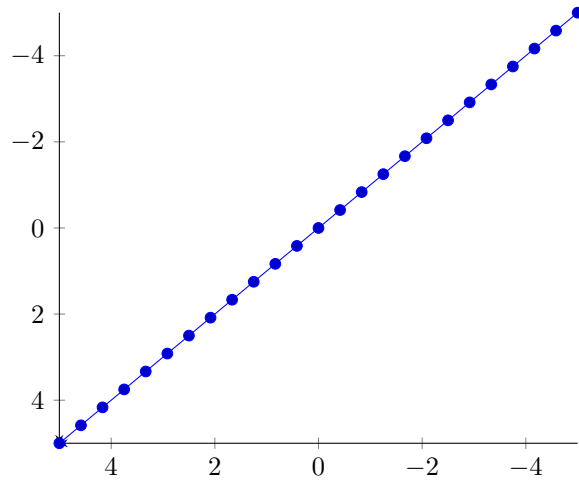


10.9.8 reversed axes and axis lines =right

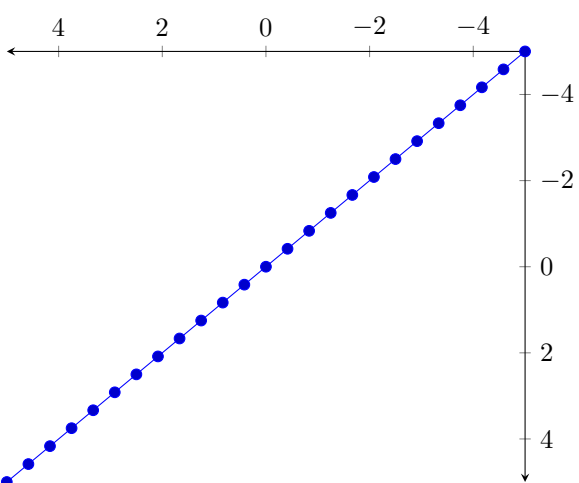
tick pos=both



tick pos=left



tick pos=right



Chapter 11

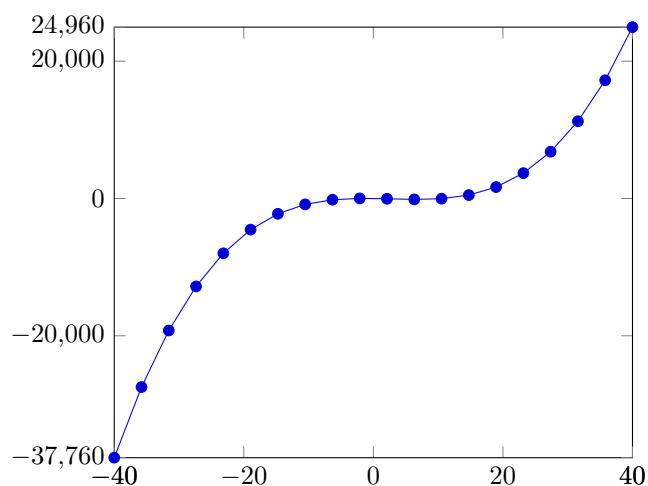
pgfplotstest.enlargelimits.tex

11.1 Limit computation

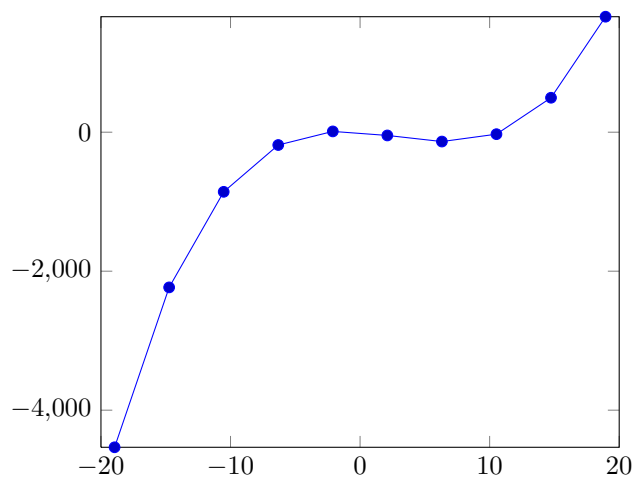
11.1.1 User specified limits

[scaled ticks = false,enlargelimits=false] in this section

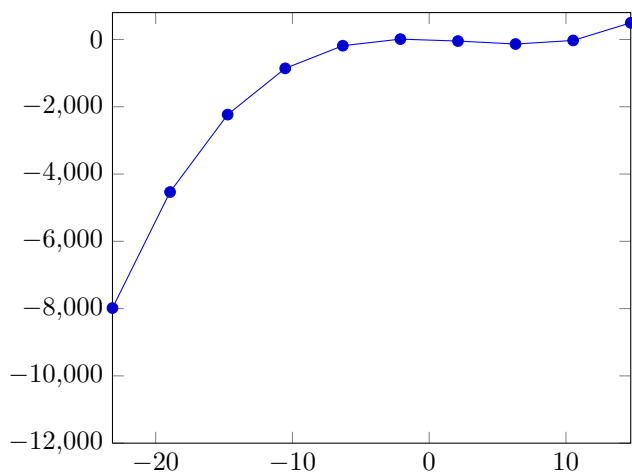
linear plot, unconstraint



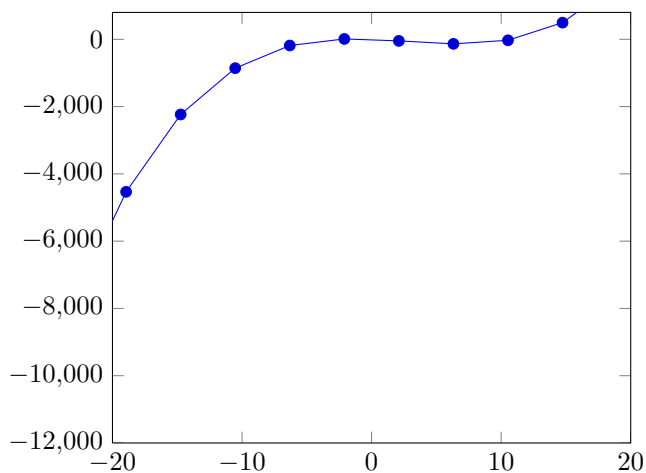
linear plot, limited to $x \in [-20, 20]$



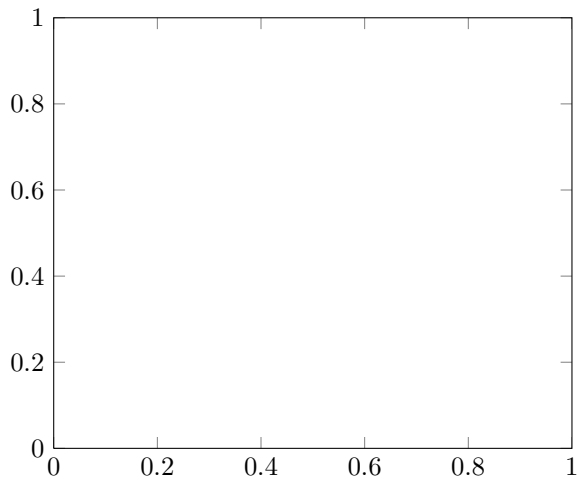
linear plot, limited to $y \in [-12000, 800]$



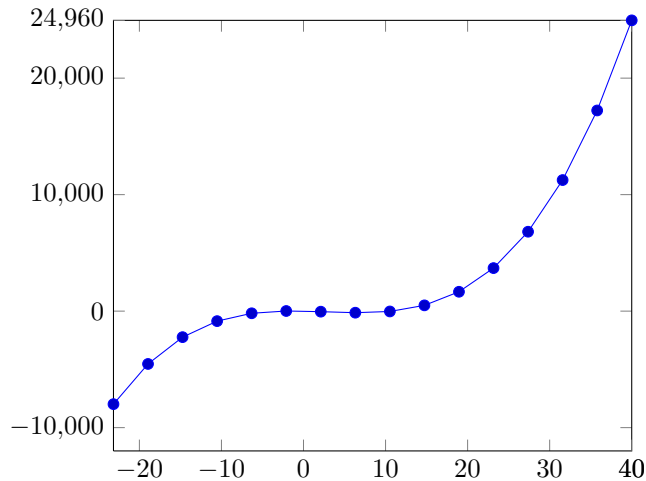
linear plot, limited to $x \in [-20, 20]; y \in [-12000, 800]$



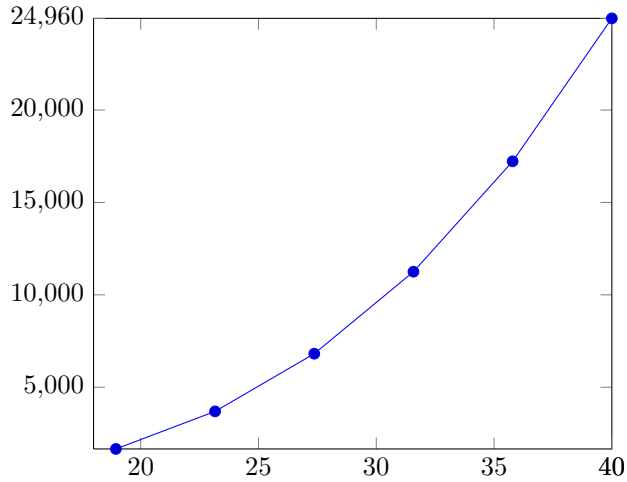
linear plot, limited to empty x -range



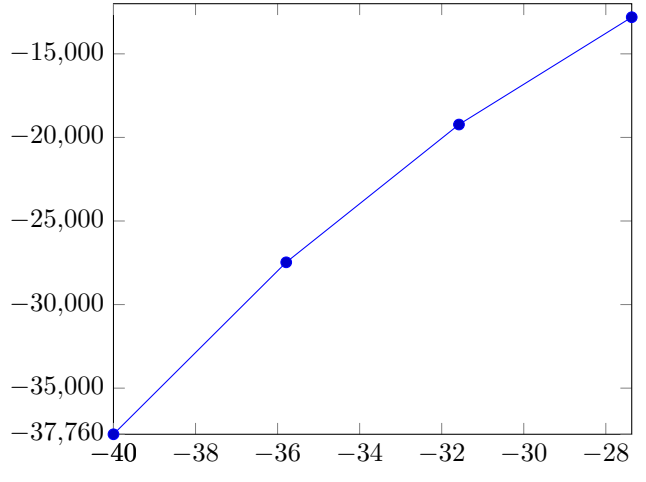
linear plot, limited only in $ymin=-12000$



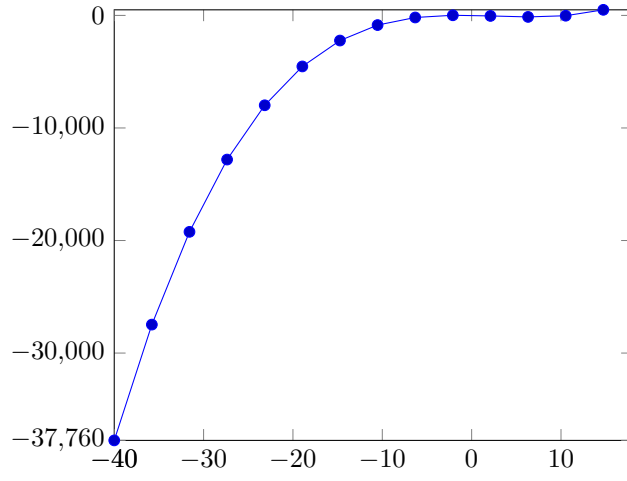
linear plot, limited to $xmin=18$



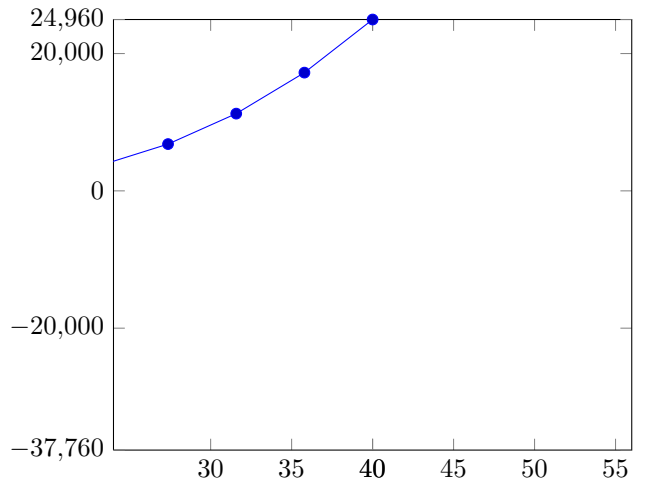
linear plot, limited only in $ymax=-12000$



linear plot, limited only in $xmax=18$



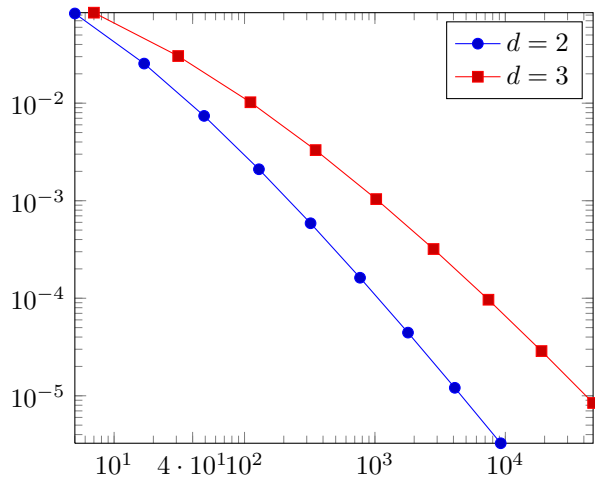
linear plot, clip limits=false and $xmin = 50$



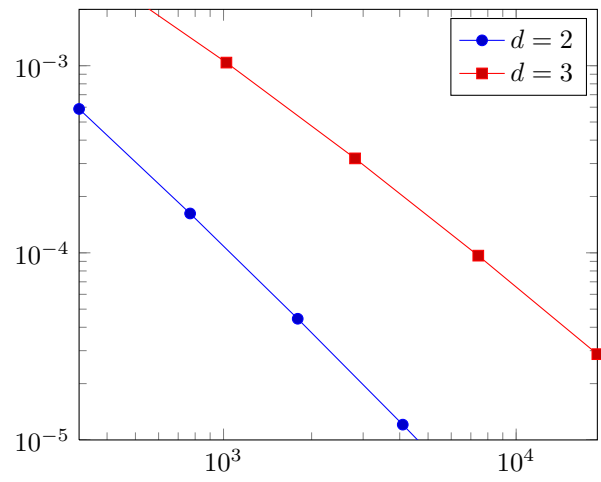
11.1.2 Log plots

Log-plots use the same code; they should work in the same way!

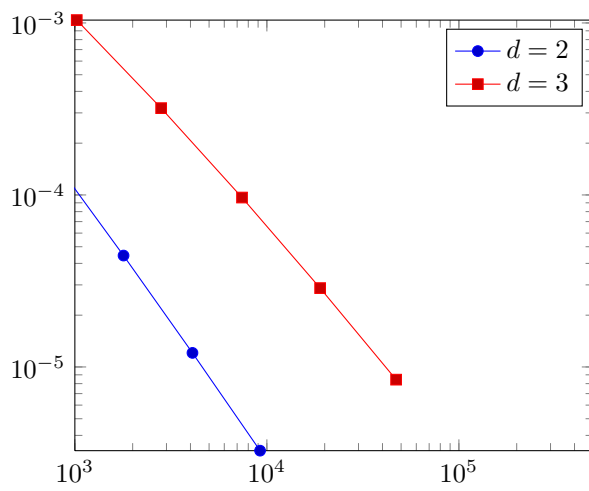
log plot unconstraint



log plot limited to $y \in [10^{-5}, 2 \cdot 10^{-3}]$

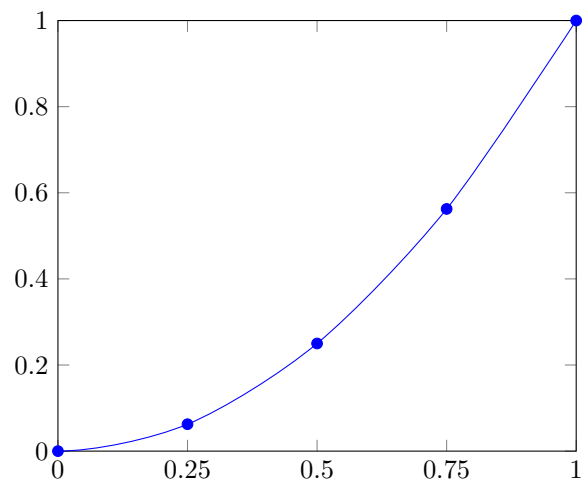


log plot limited to $x \in [10^3, 5 \cdot 10^5]$

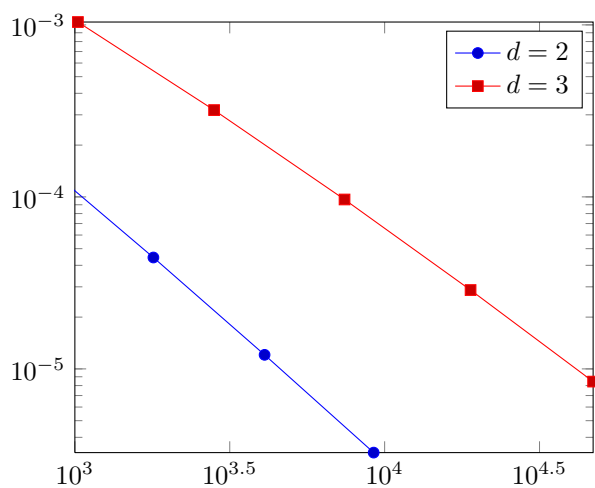


11.1.3 Enlargelimits tests

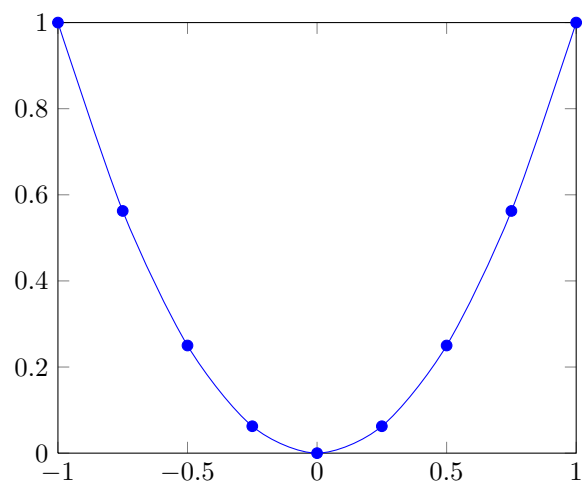
enlargelimits=false, x limits provided



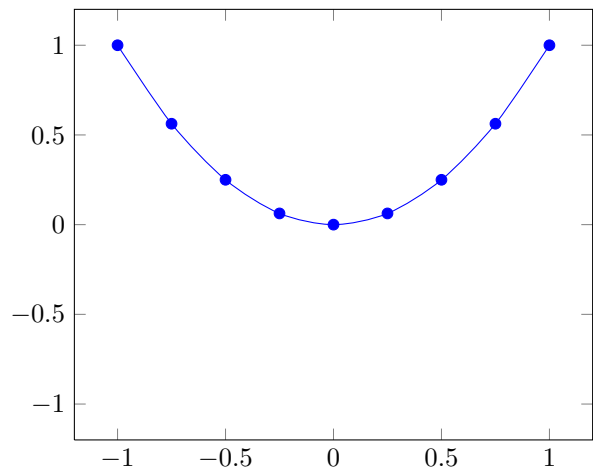
log plot limited to $x > 10^3$



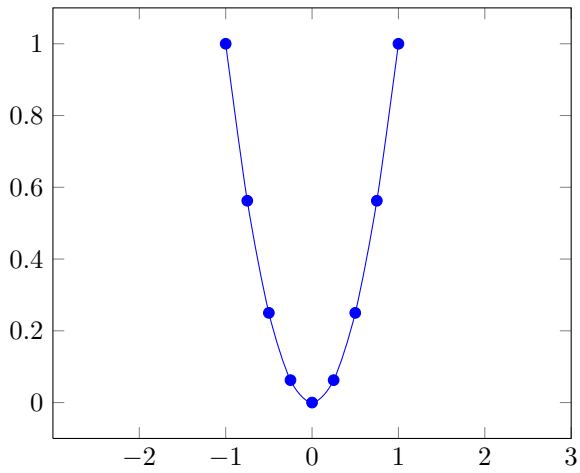
enlargelimits=false, no limits provided



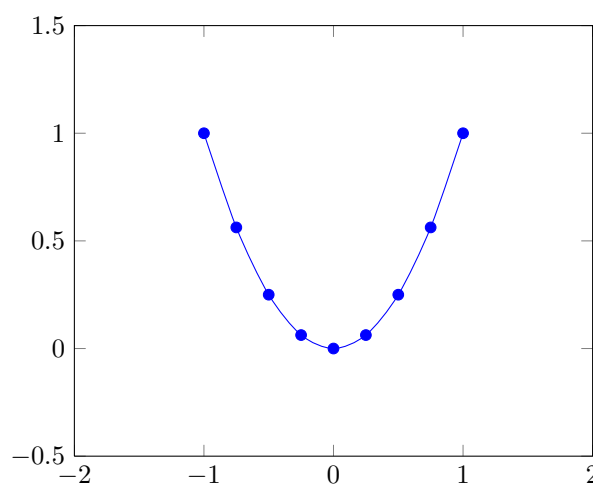
enlarge_limits=true, all limits provided $[-1, 1] \times [-1, 1]$



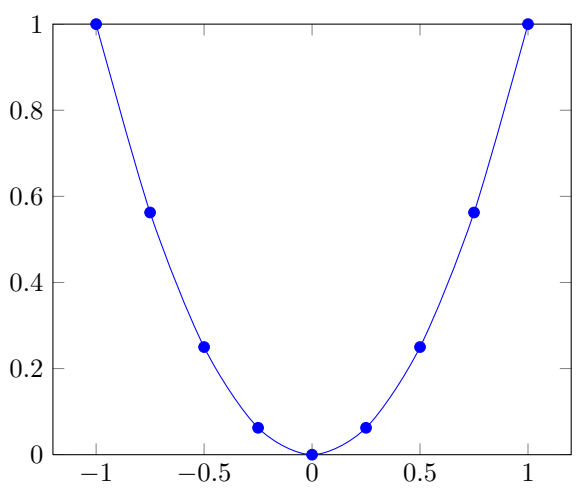
enlarge x limits=1



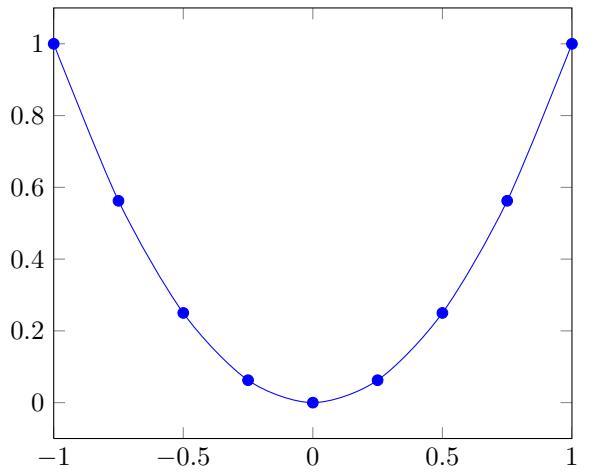
enlarge_limits=0.5



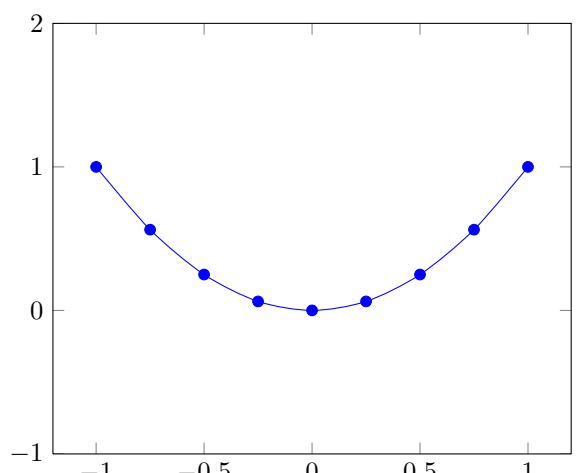
enlarge y limits=false



enlarge x limits=false

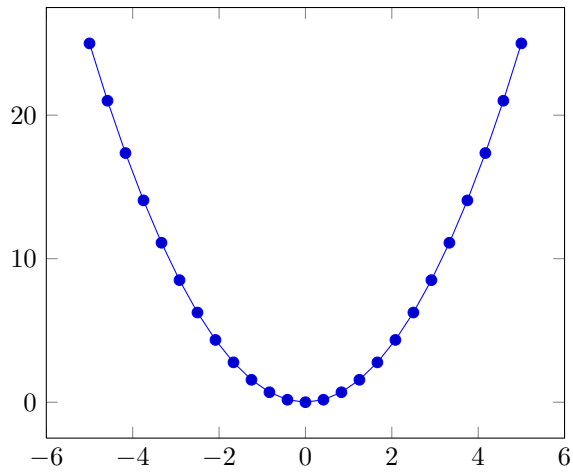


enlarge y limits=1

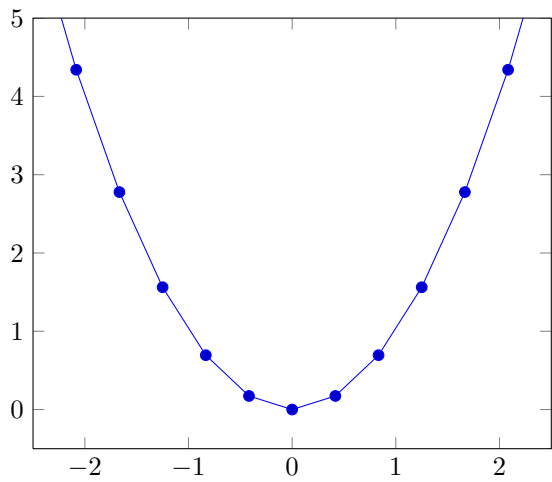


11.2 Once again with partial limits

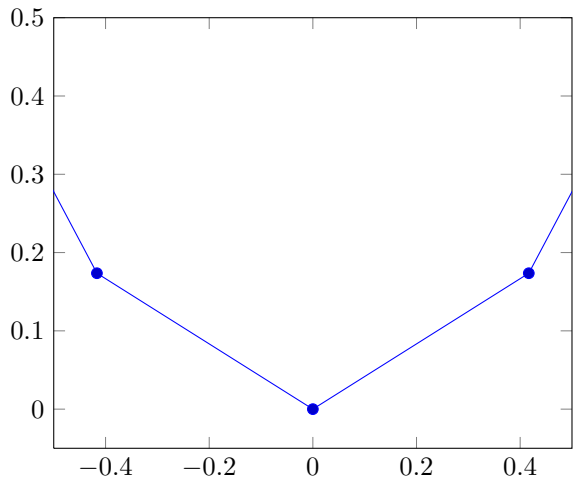
11.2.1 Unconstraint



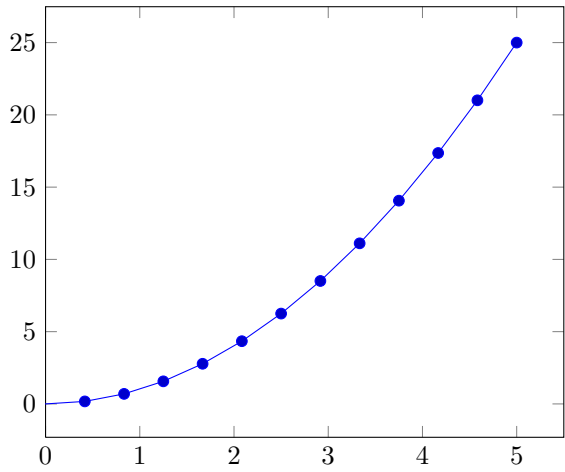
11.2.2 ymax=5



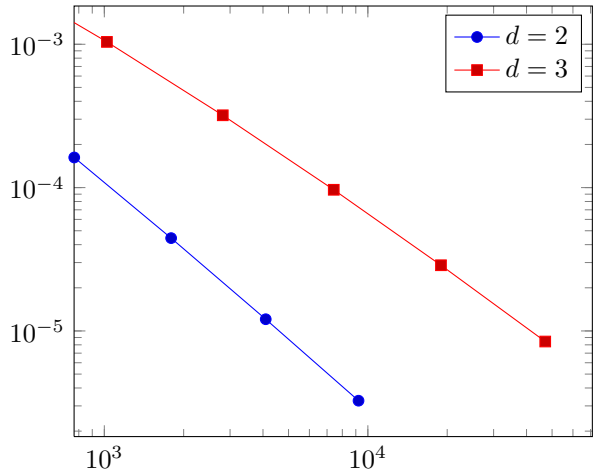
11.2.3 ymax=0.5



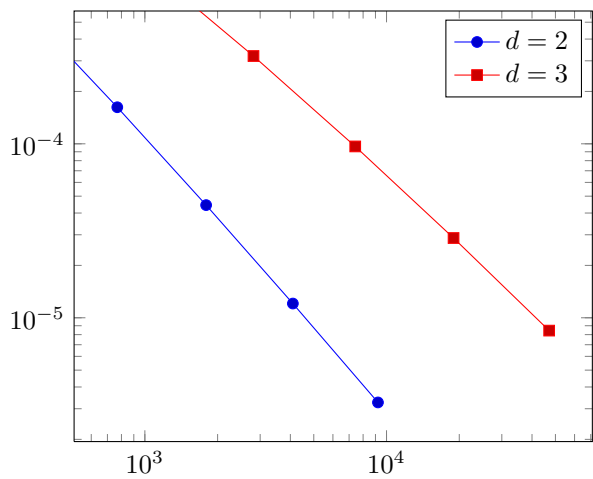
11.2.4 xmin=0



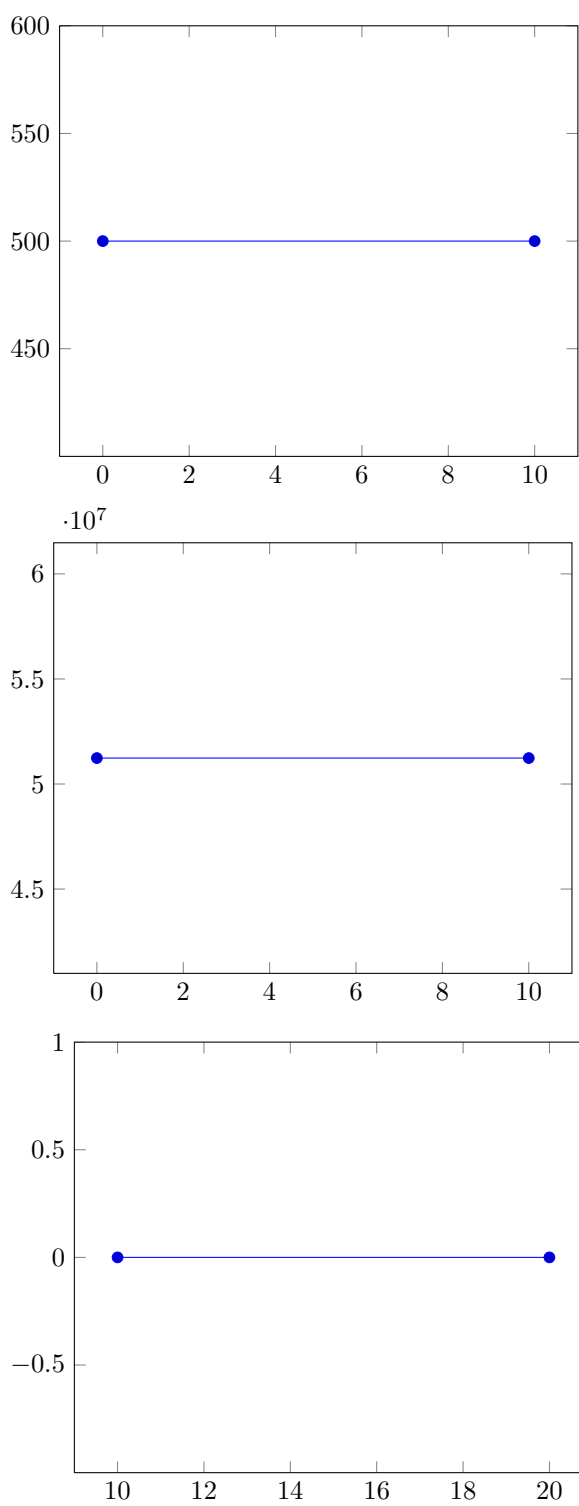
11.2.5 xmin=768



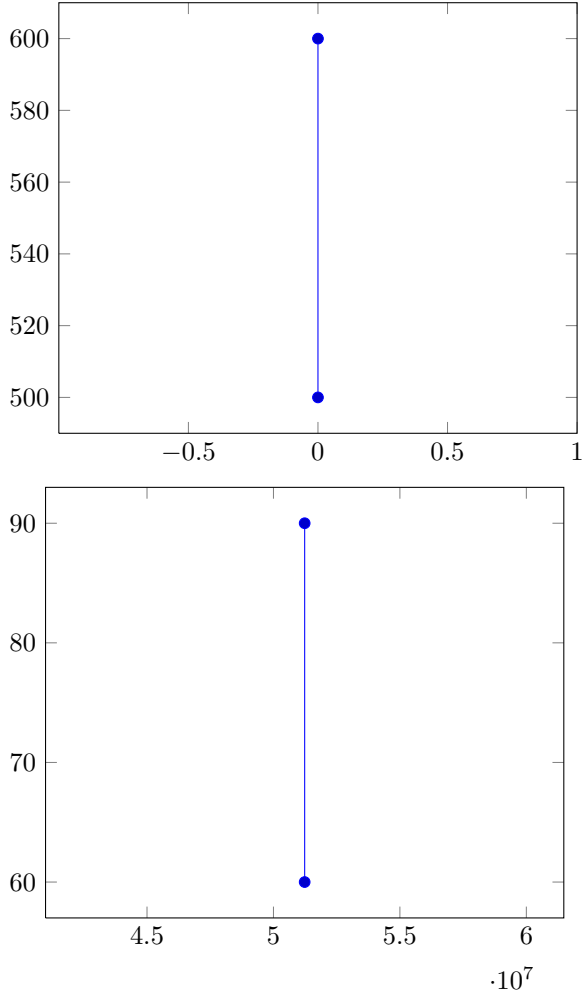
11.2.6 ymax=5.8e-4



11.2.7 constant in y



11.2.8 constant in x

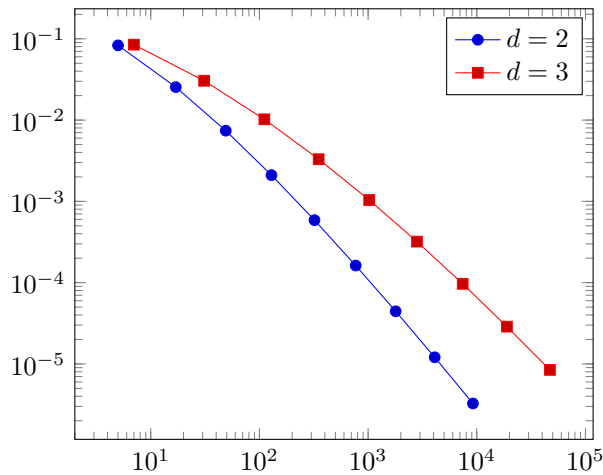


Chapter 12

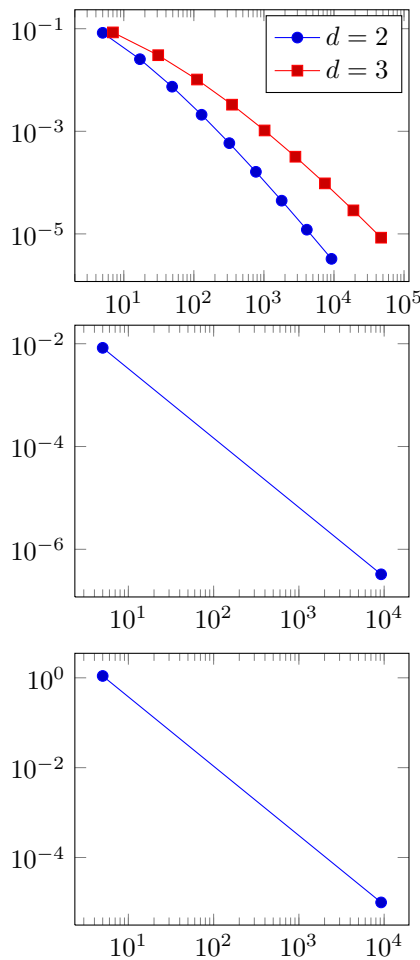
pgfplotstest.logplotenv.tex

12.1 Default options log plot

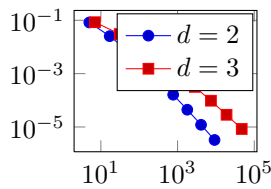
12.1.1 Default size



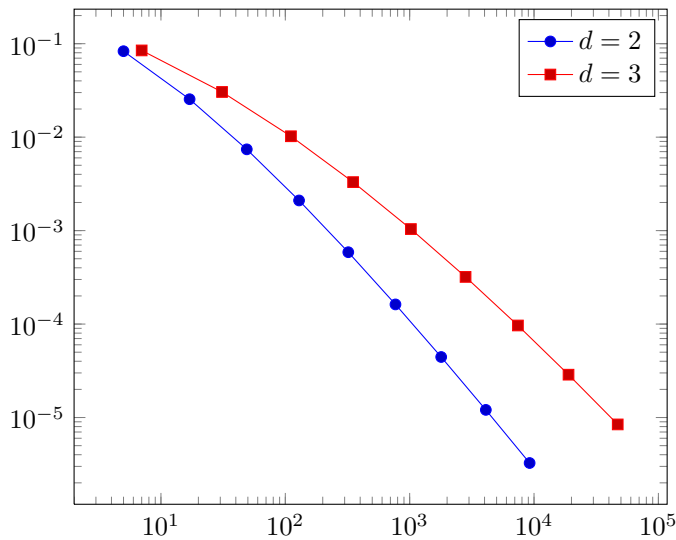
12.1.2 Small size



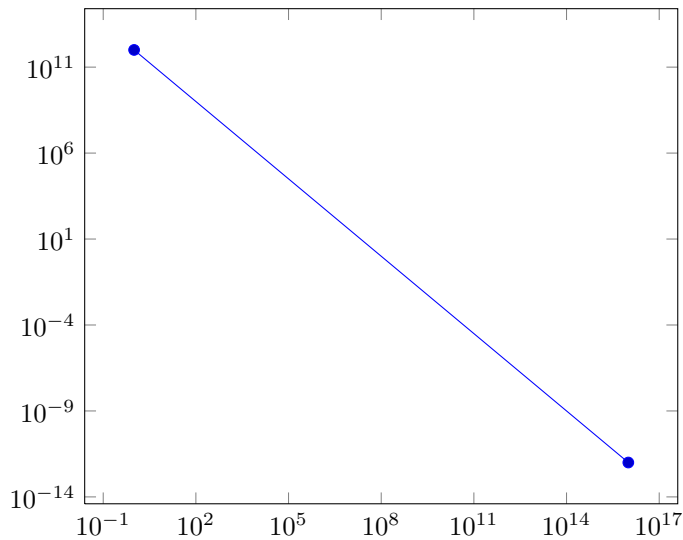
12.1.3 Very small size



12.1.4 Large size

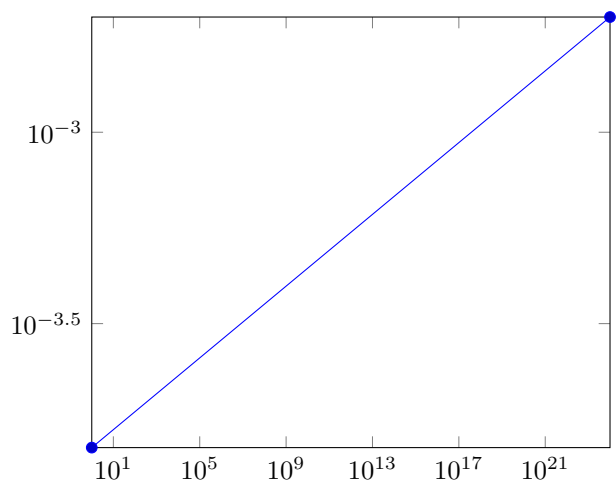


12.1.5 Large size; large range



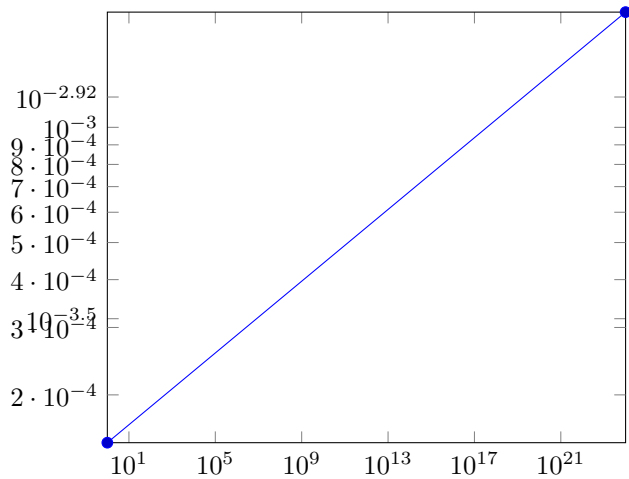
12.1.6 Extremely small y range for log plot

Without extra ticks, enlargelimits=false

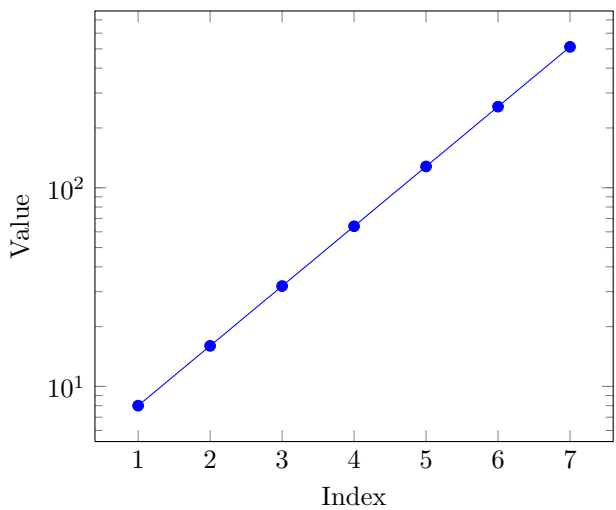


With extra ticks, enlargelimits=false

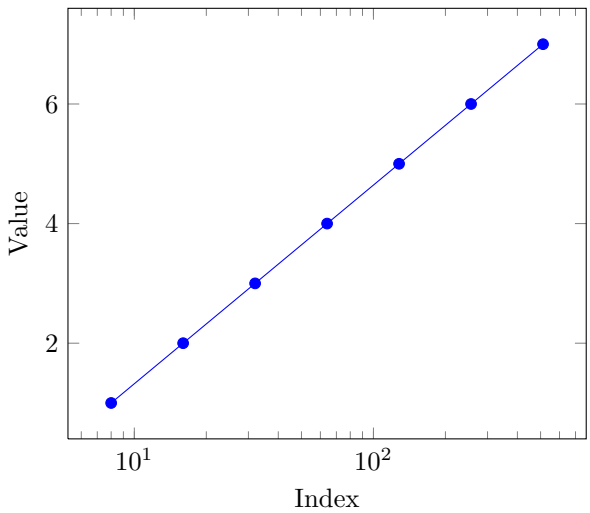
extra y ticks={2e-4,3e-4,4e-4,5e-4,6e-4,7e-4,8e-4,9e-4,1.2e-3}



12.2 Semilogy plot



12.3 Semilogx plot

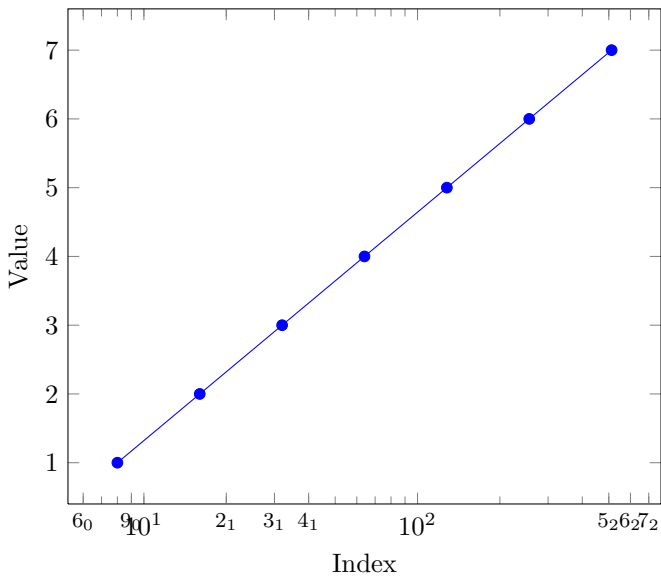


12.3.1 Extra ticks

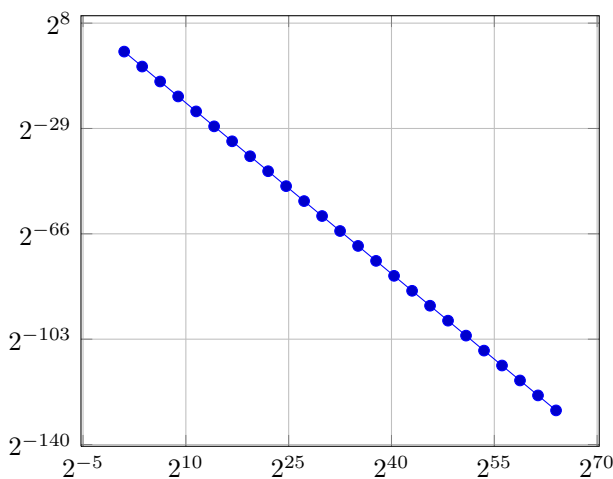
Options:

extra x ticks={6e0,9e0,2e1,3e1,4e1,5e2,6e2,7e2,8e2,9e2},

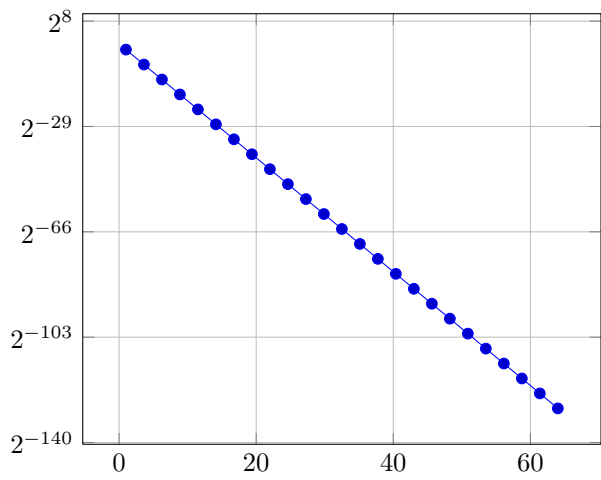
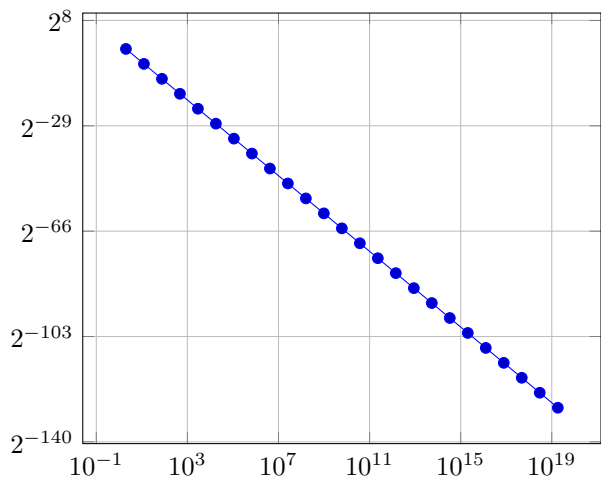
extra x tick style={/pgf/number format/sci sub-script,font=footnotesize},



12.4 log basis y=2, log basis x=2



12.5 log basis y=2, std for x



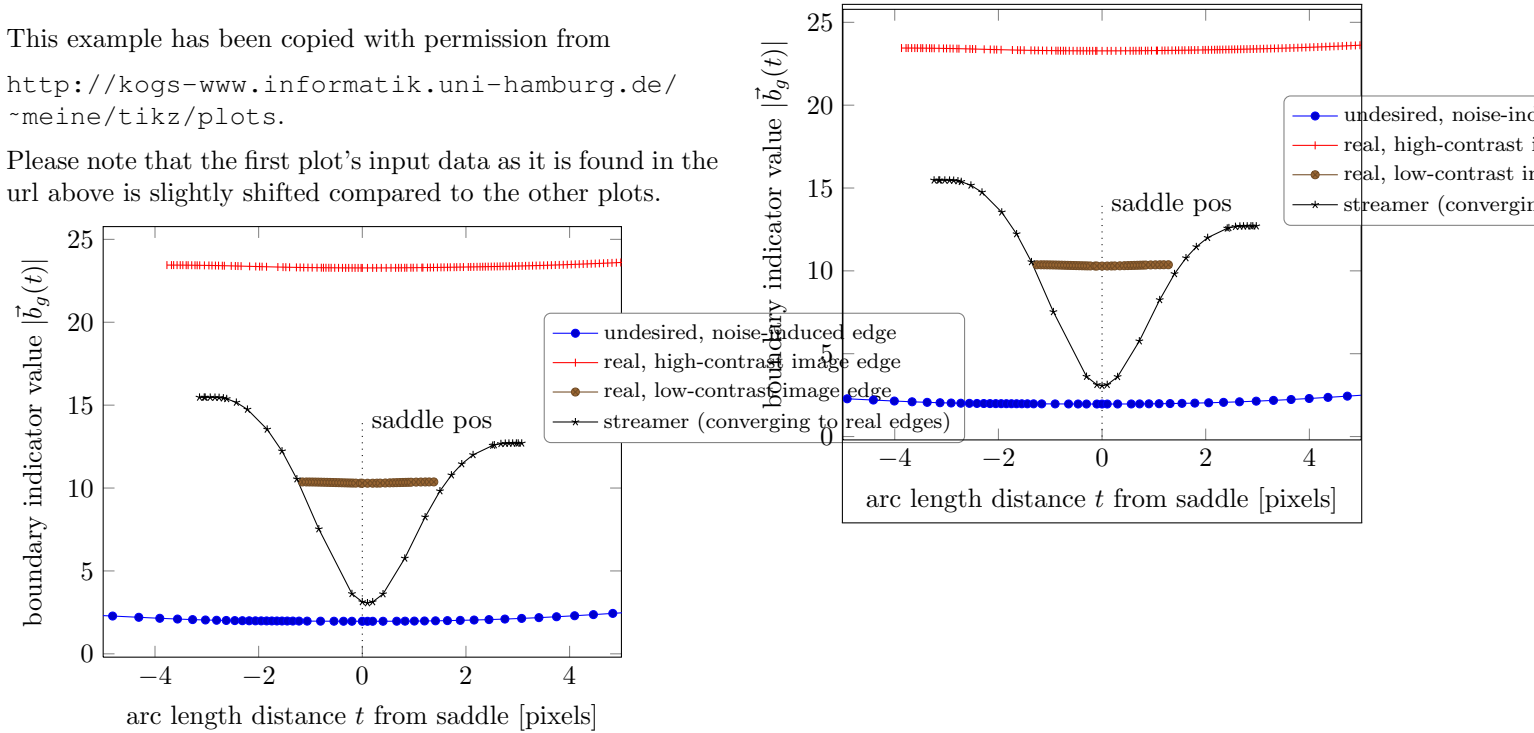
Chapter 13

pgfplotstest.hansmeine_app.tex

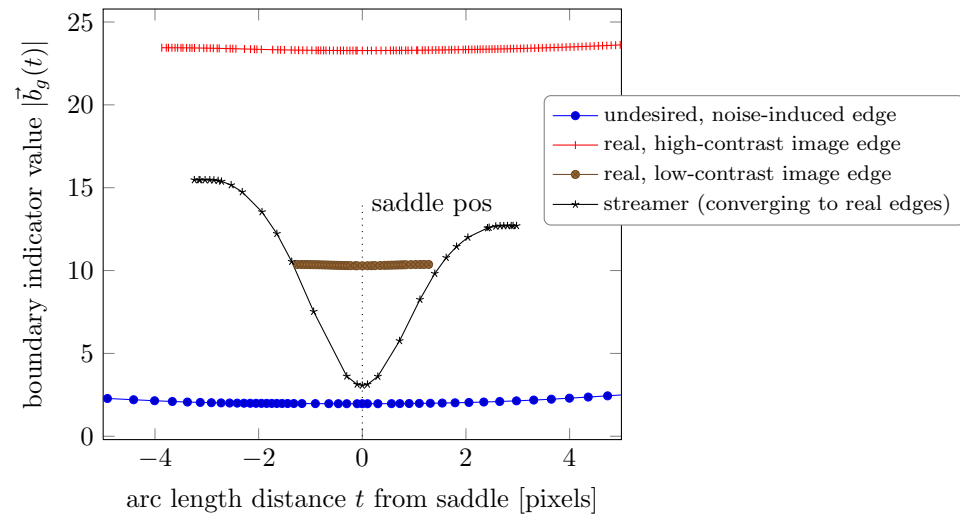
13.1 Application example of Hans Meine

13.1.2 With plot file and restricted bounding box, centered

This example has been copied with permission from <http://kogs-www.informatik.uni-hamburg.de/~meine/tikz/plots>. Please note that the first plot's input data as it is found in the url above is slightly shifted compared to the other plots.



13.1.1 With plot file



Chapter 14

pgfplotstest.3d.tex

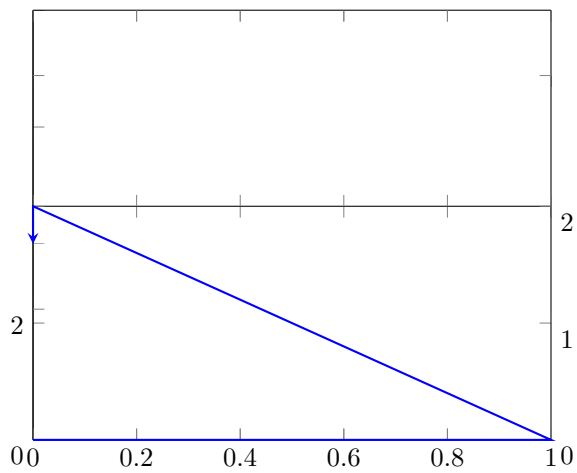
14.1 View

The following test plot has

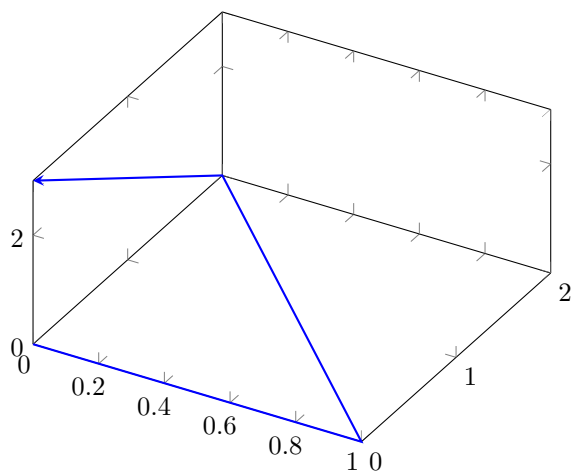
```
\addplot3[blue,-stealth,thick] coordinates
{(0,0,0) (1,0,0) (0,2,0) (0,0,3)};
```

14.1.1 Test von YAW

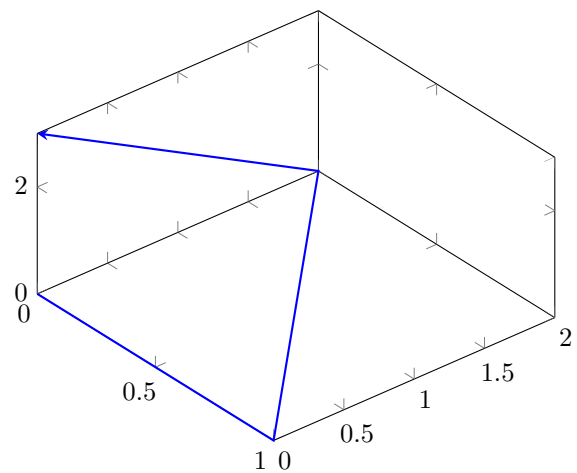
fr {0}{50}:



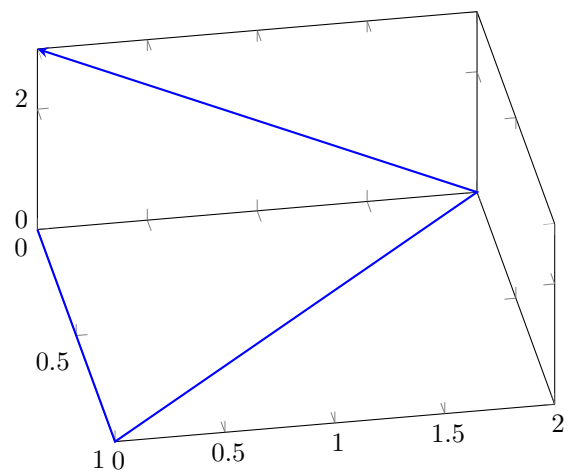
fr {30}{50}:



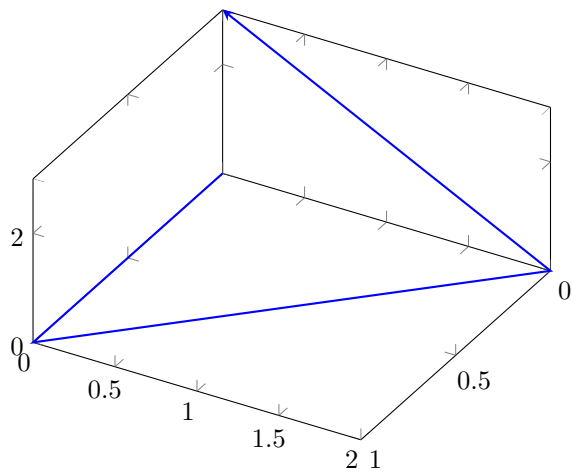
fr {50}{50}:



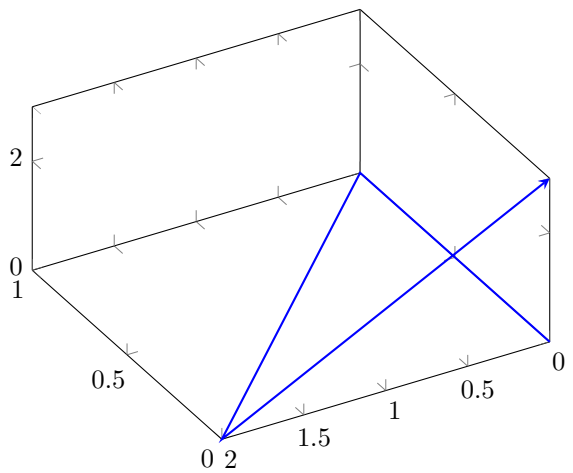
fr {80}{50}:



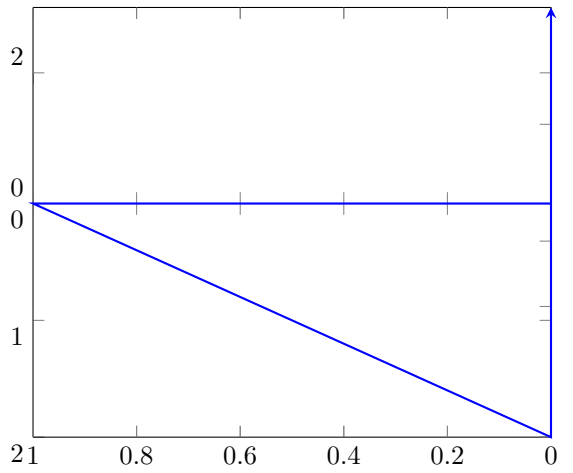
fr {120}{50}:



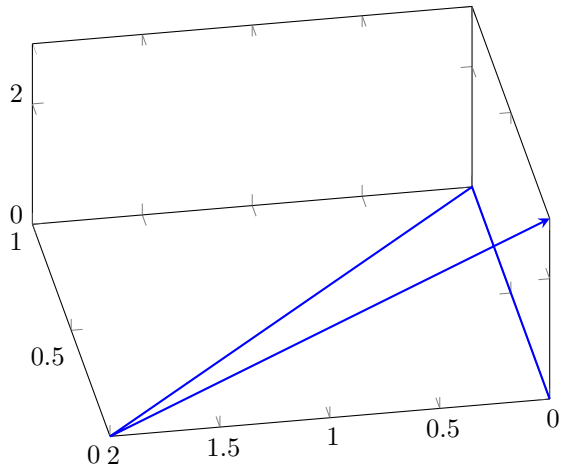
fr {240}{50}:



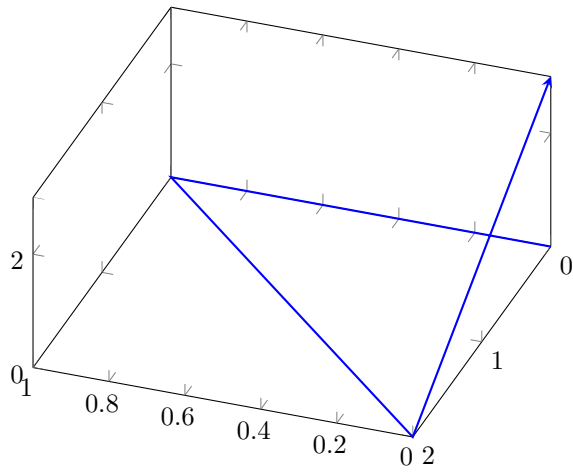
fr {180}{50}:



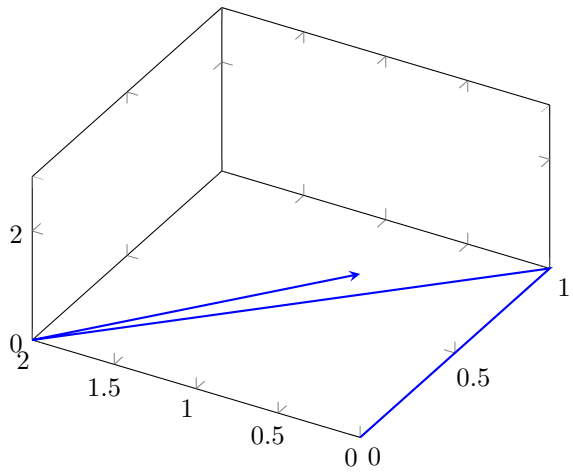
fr {260}{50}:



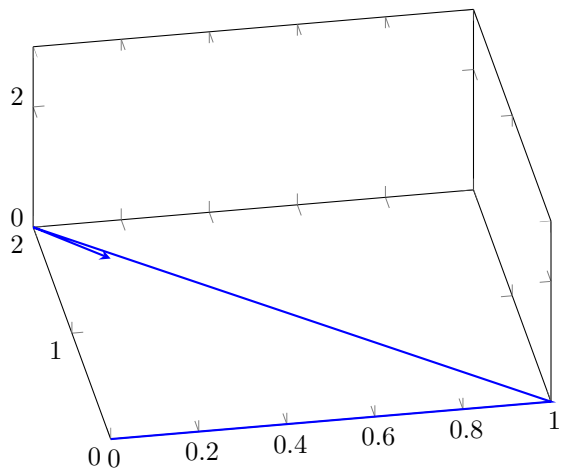
fr {200}{50}:



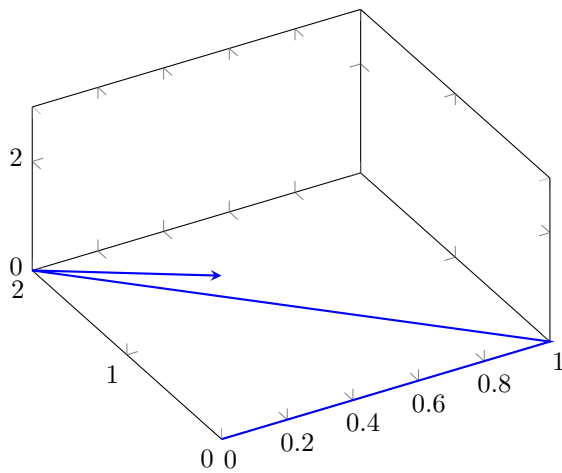
fr {300}{50}:



fr {350}{50}:

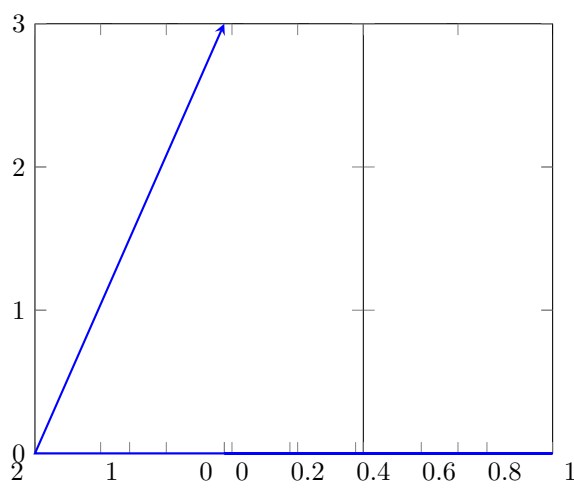


fr {-30}{50}:

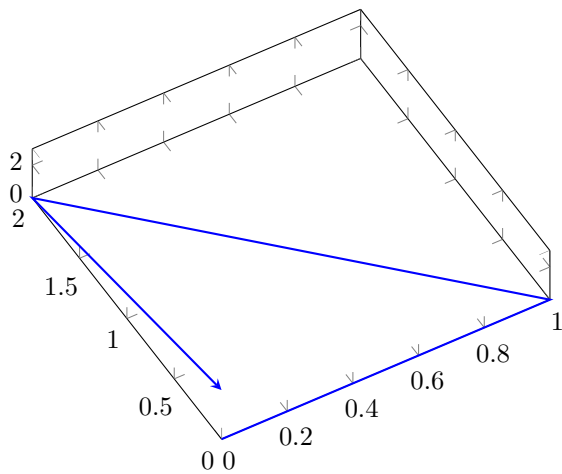


14.1.2 Test von PITCH

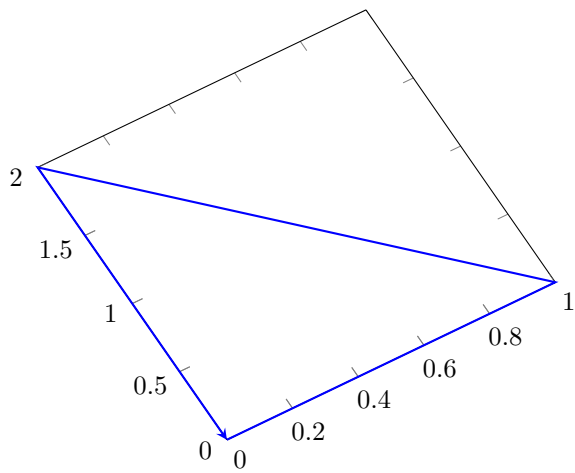
fr {-30}{0}:



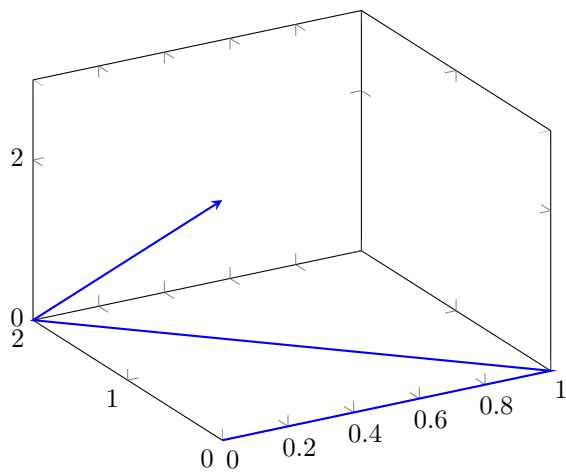
fr {-30}{80}:



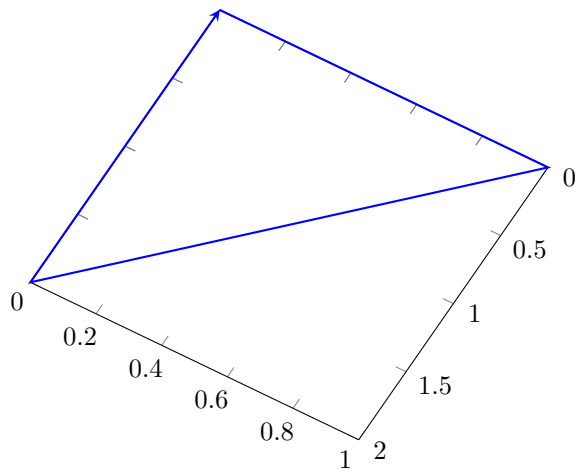
fr {-30}{90}:



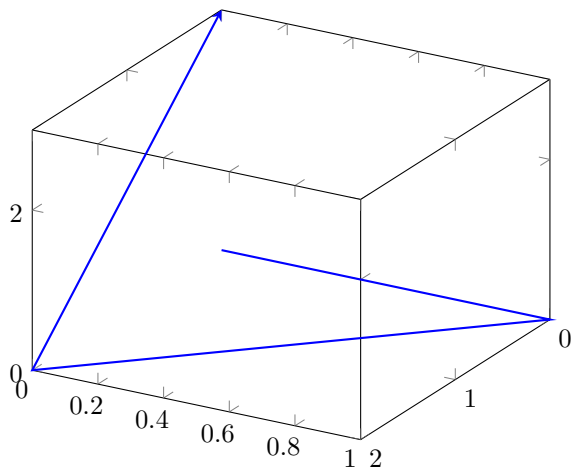
fr {-30}{30}:



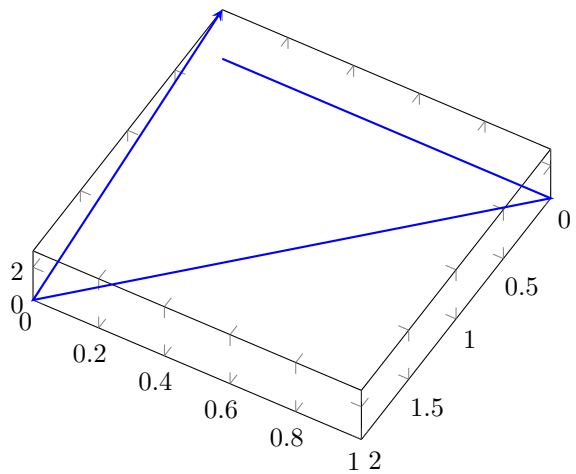
fr {-30}{-90}:



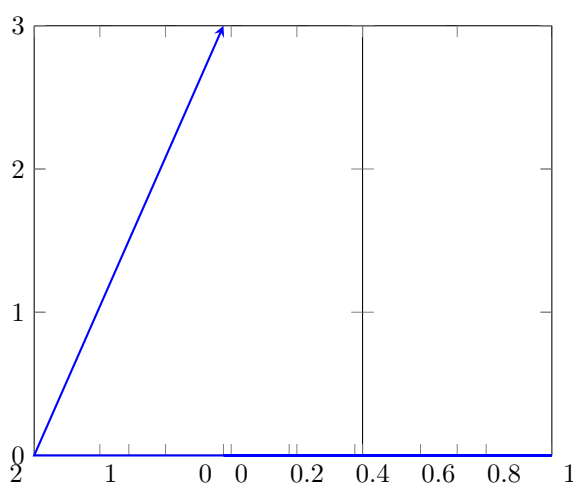
fr {-30}{-30}:



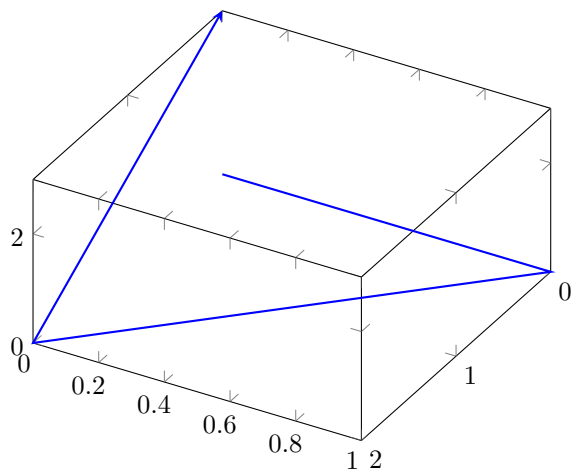
fr {-30}{-80}:



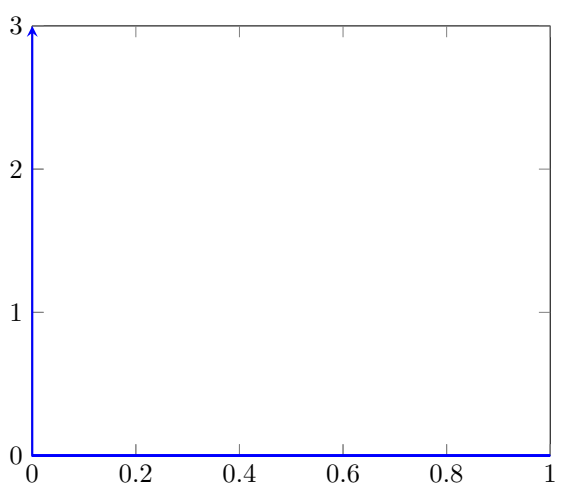
fr {-30}{0}:



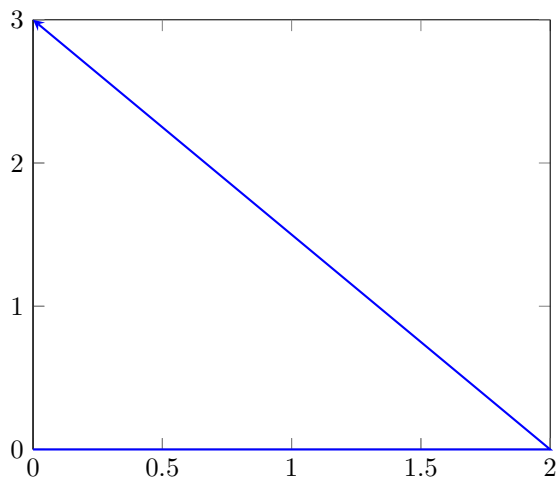
fr {-30}{-50}:



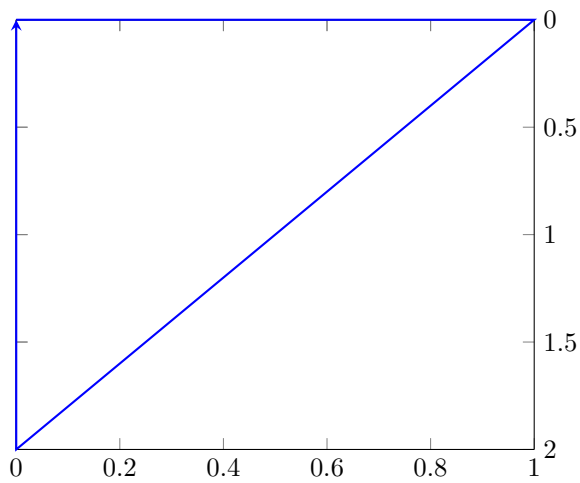
Special case view=0,0



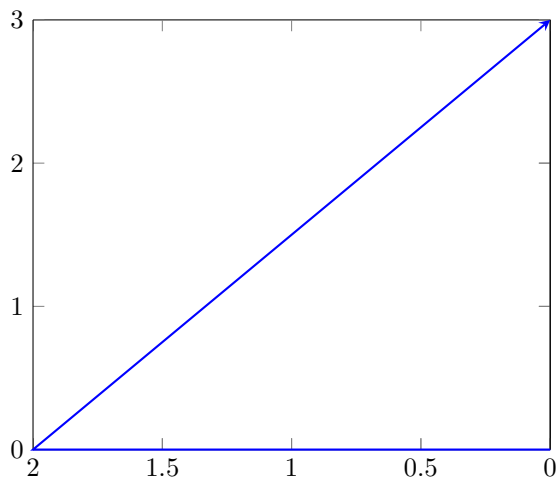
Special case view=90,0



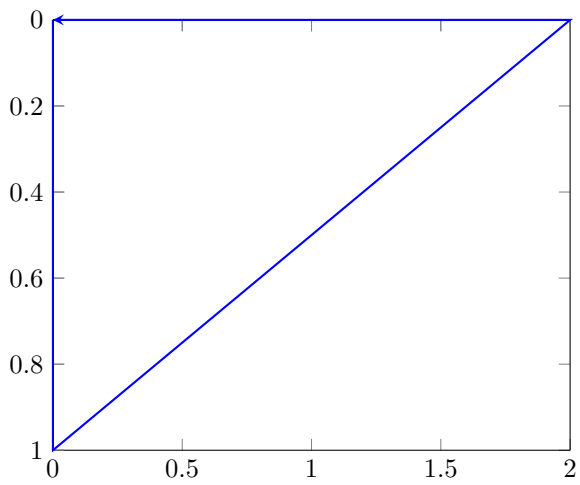
Special case view=0,-90



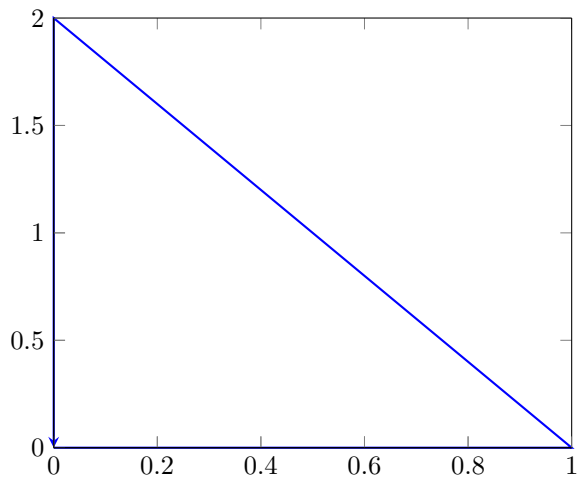
Special case view=-90,0



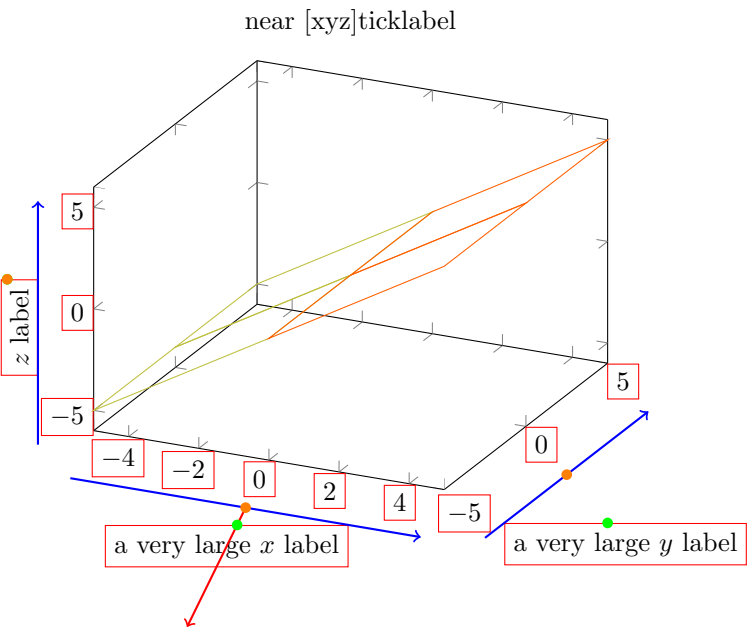
Special case view=90,90

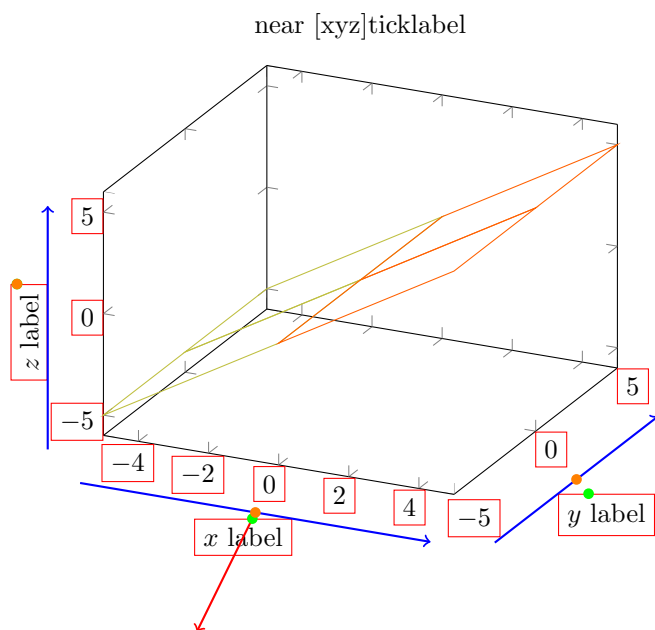
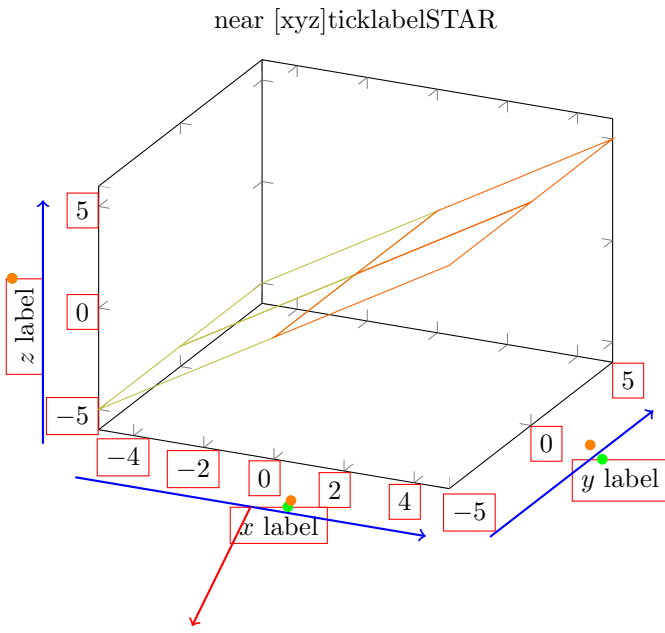
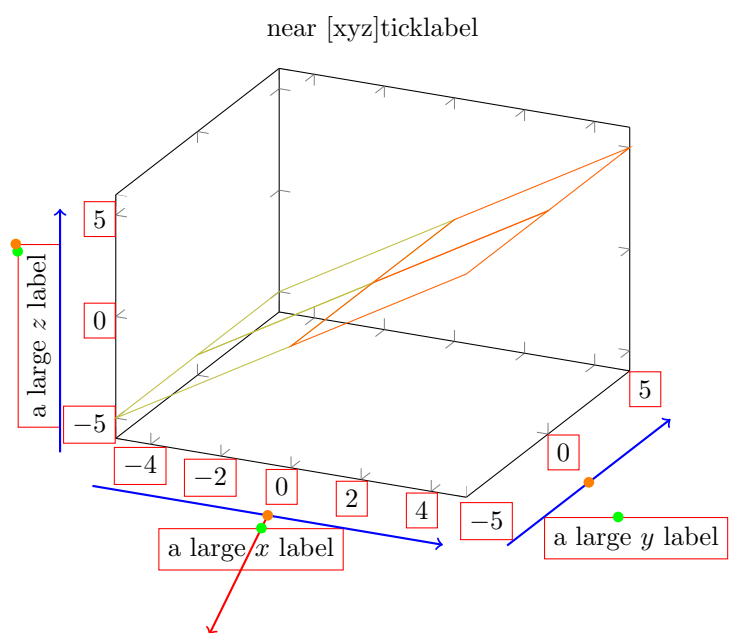
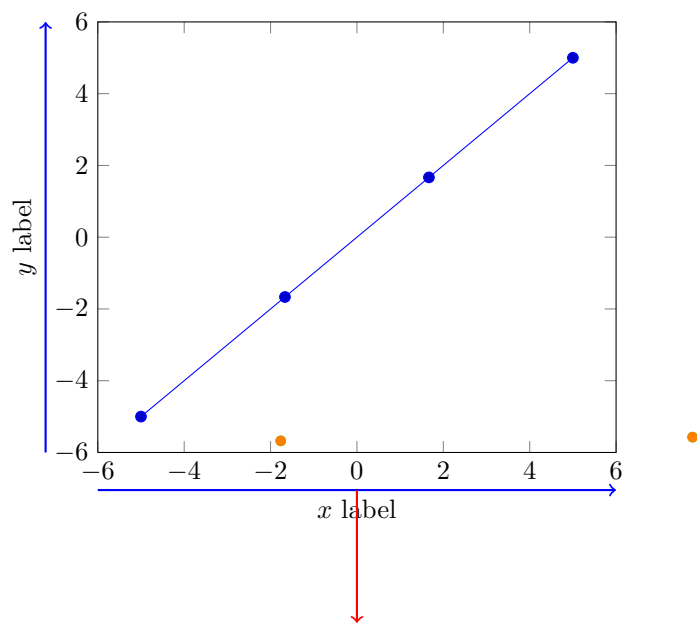
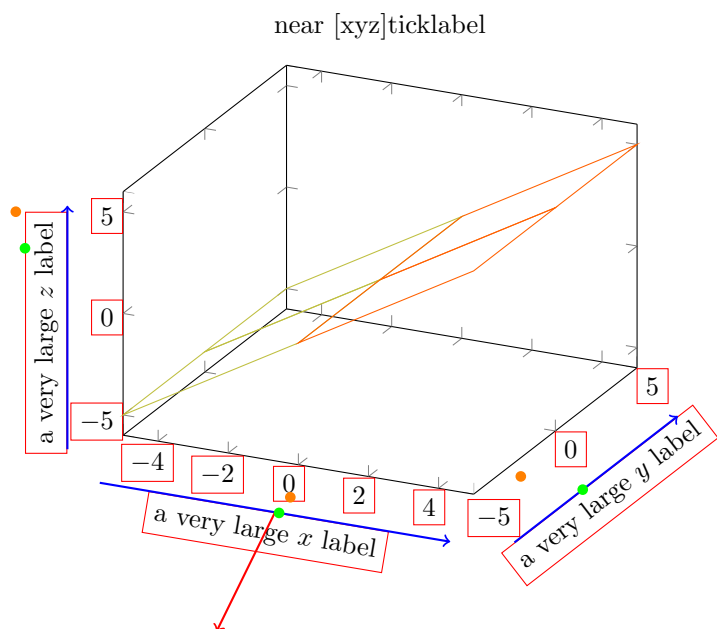


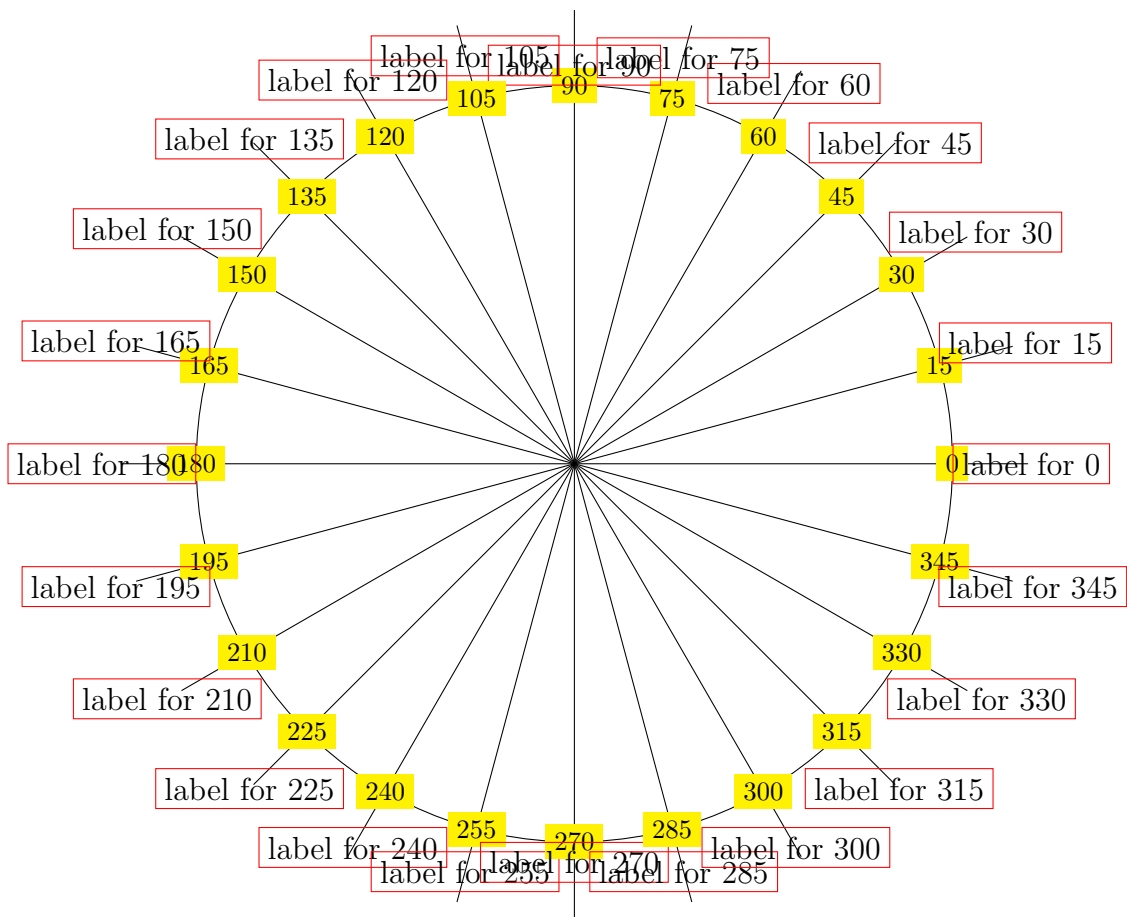
Special case view=0,90



14.2 Tests and Debugging of near ticklabel anchors

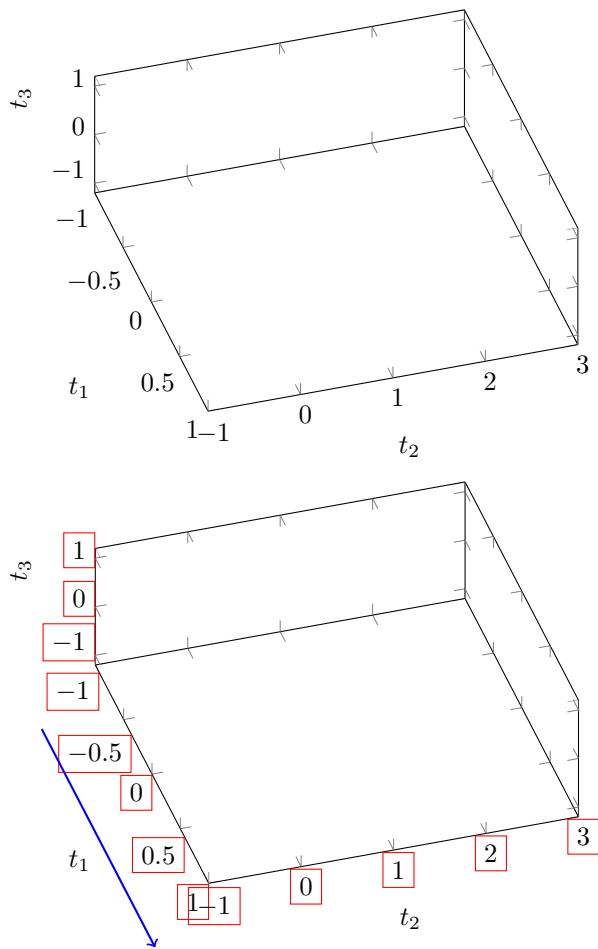




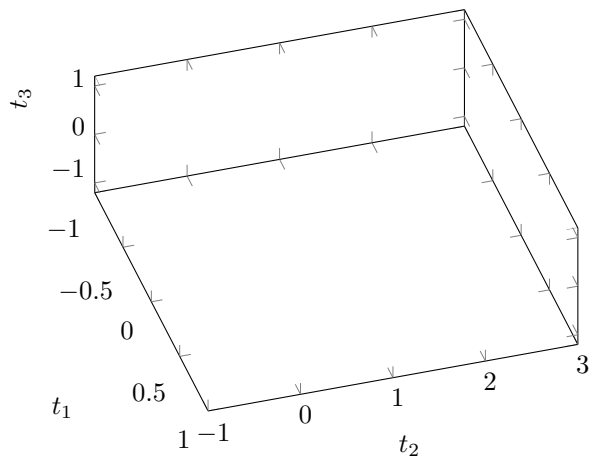


14.2.1 Placement of ticklabels

Here, a -0.5 penetrated the axis in an earlier version, should be fixed now:

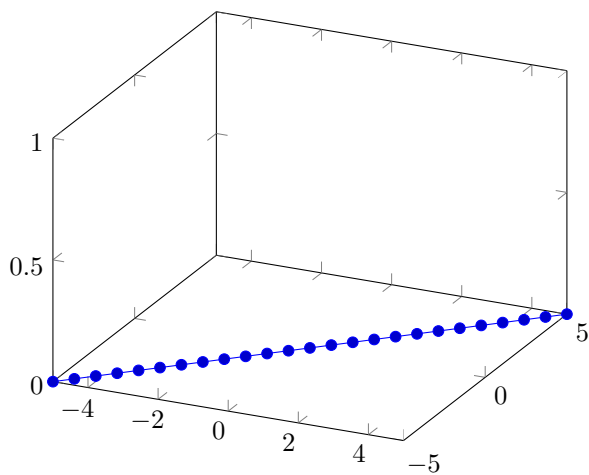


mit `xticklabel shift=5pt`

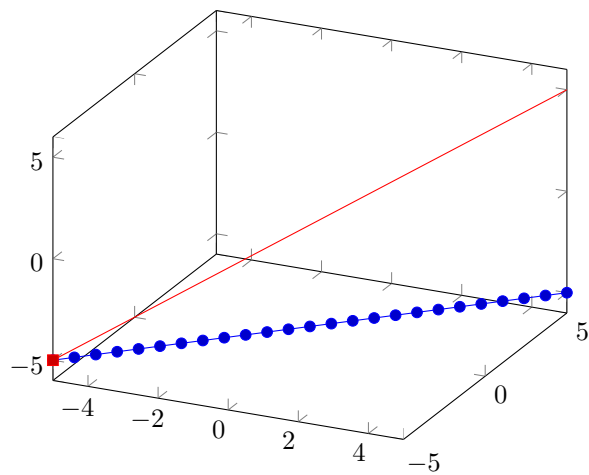


14.3 Sanity checking

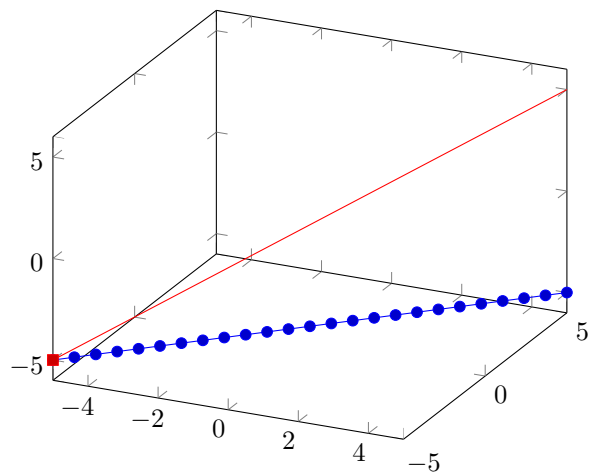
14.3.1 `addplot` in 3D axis



14.3.2 `addplot` and `addplot3` in an axis



14.3.3 `addplot` and `addplot3` in an axis

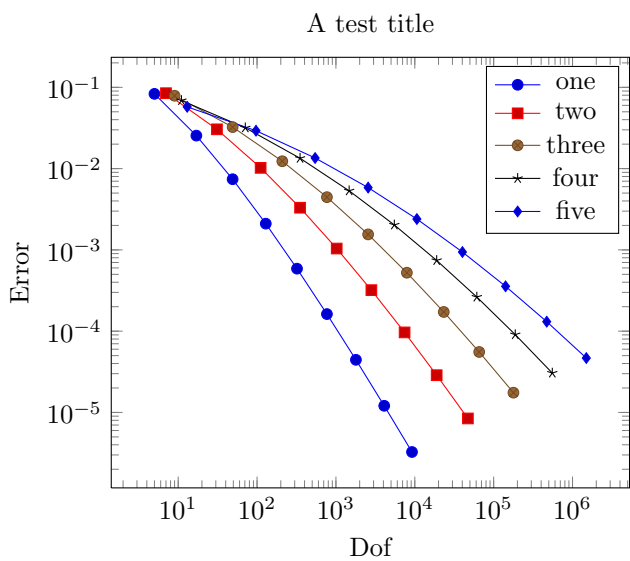


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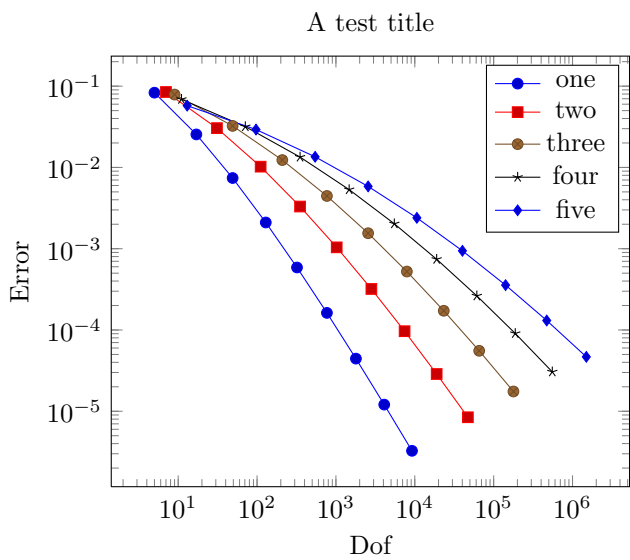
pgfplotstest.legend.tex

15.1 Legends

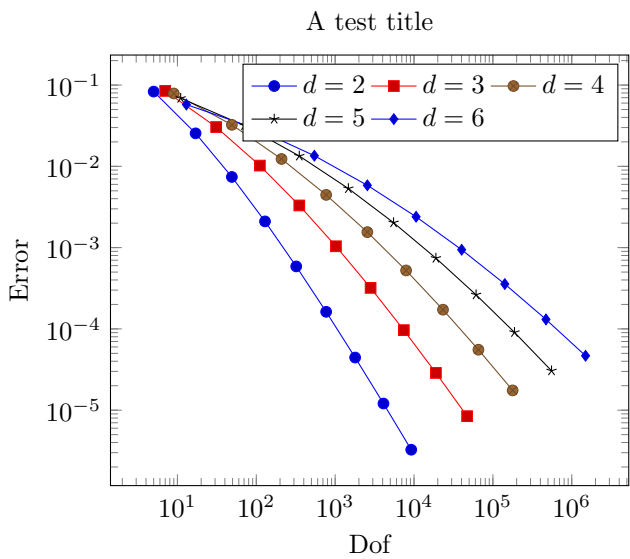
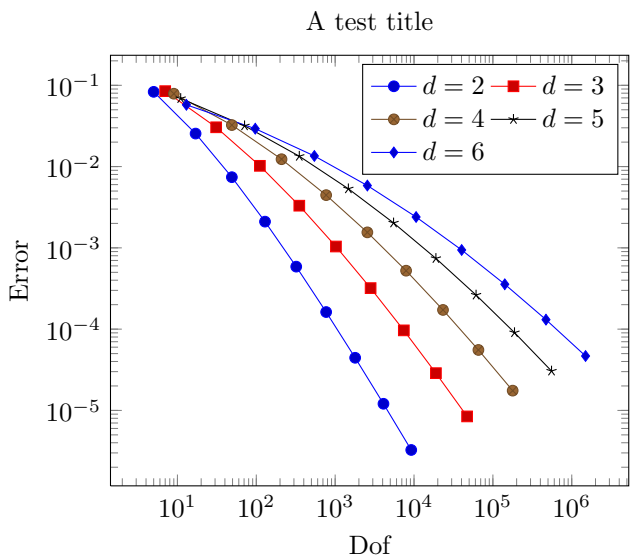
15.1.1 Old-format legends with two backslashes as separator



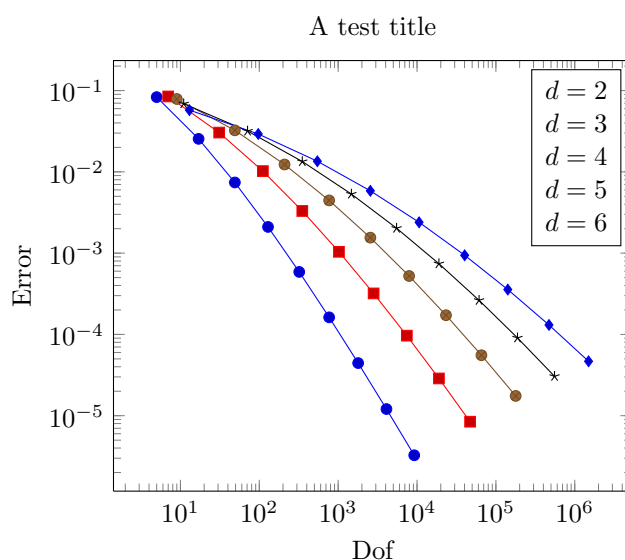
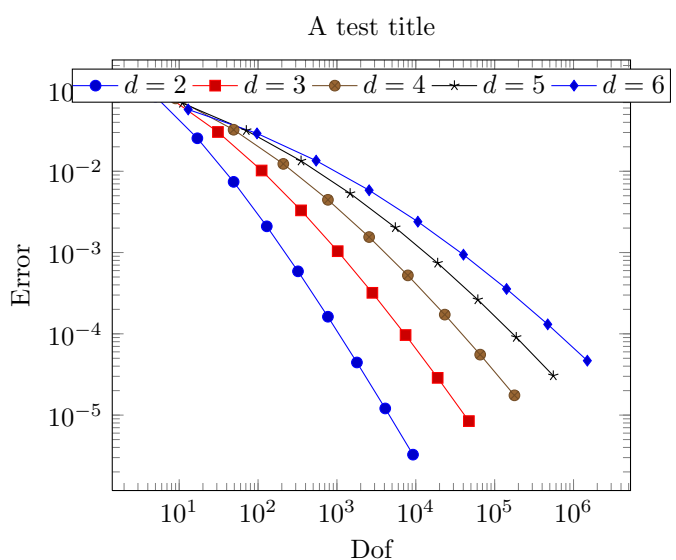
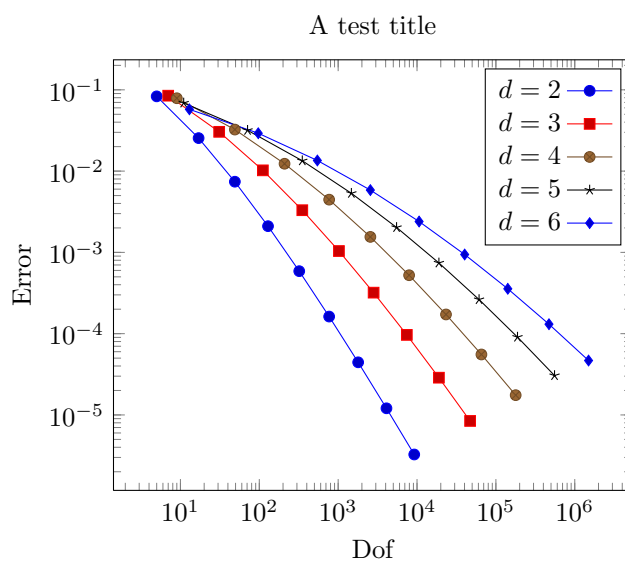
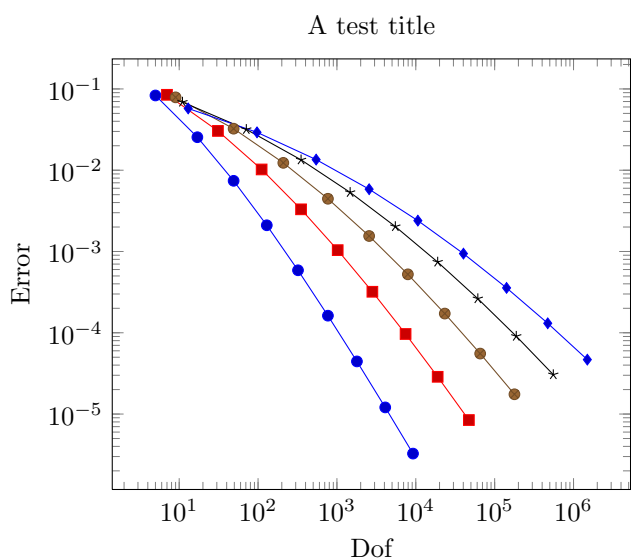
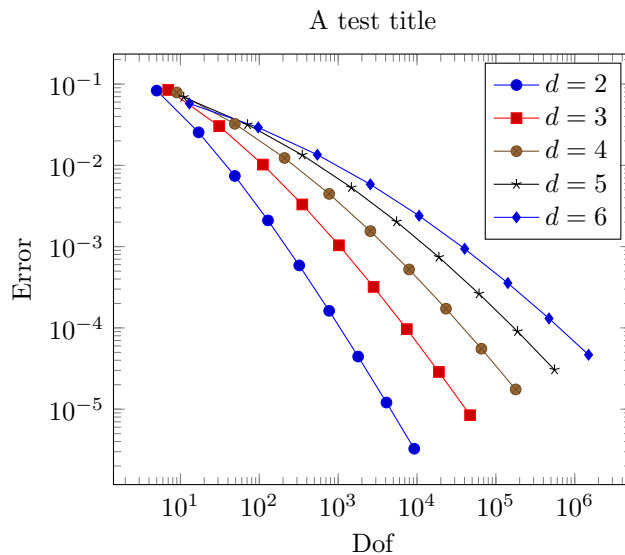
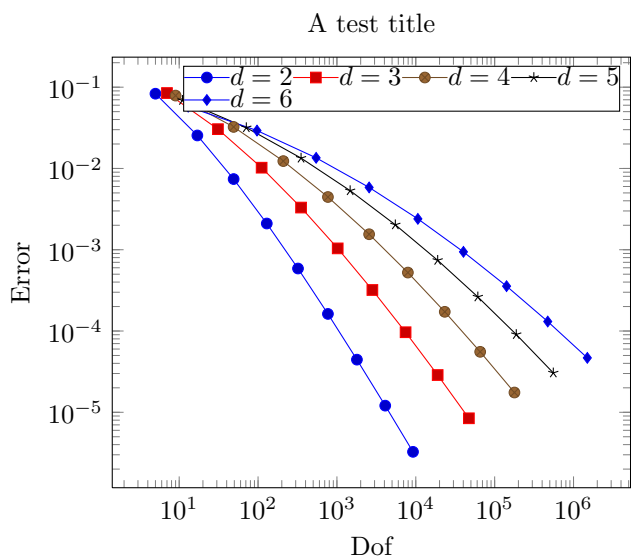
15.1.2 Using comma-separated-legends

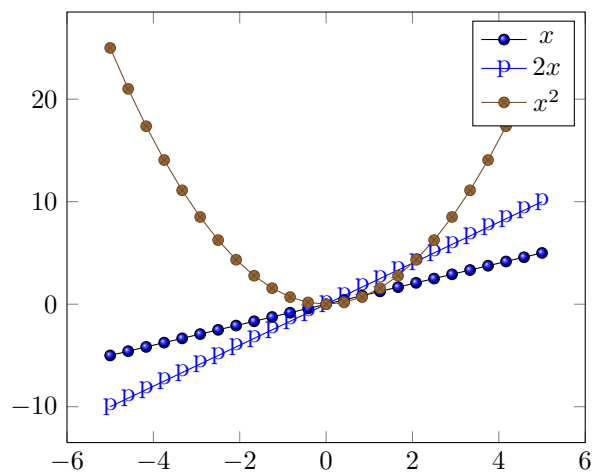


15.1.3 testing legend columns



15.1.4 “legend plot pos” options





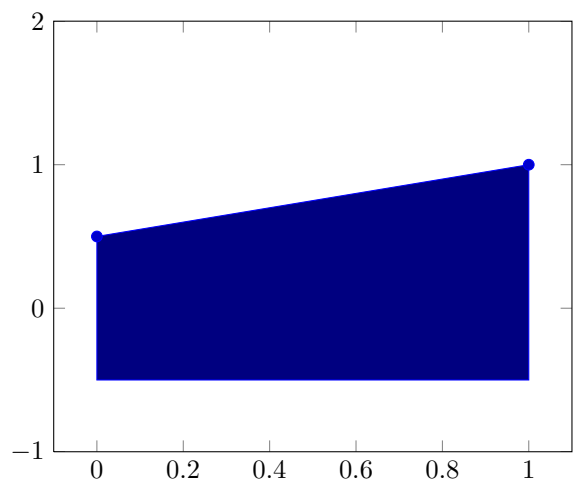
Chapter 16

pgfplotstest.misc.tex

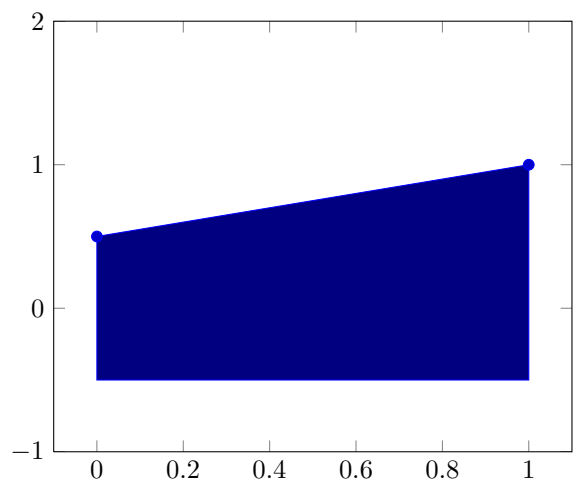
16.1 Paths after addplot

16.1.1 plot coordinates

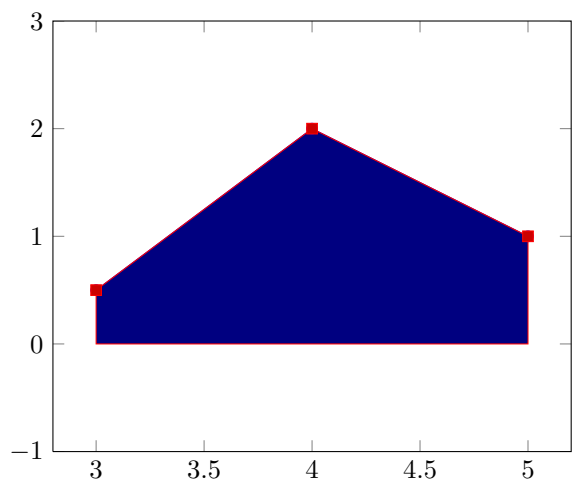
without space after 'coordinates'



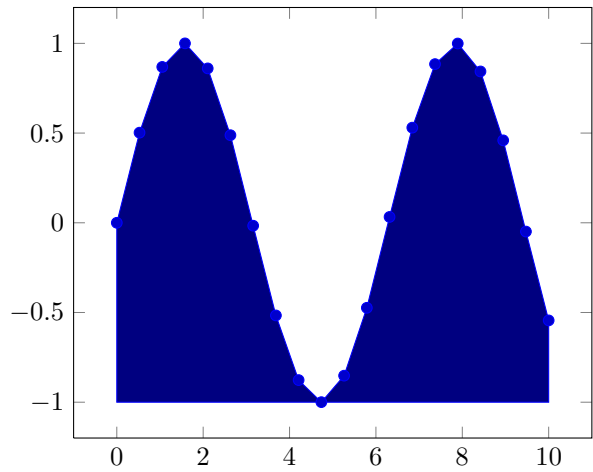
with space after 'coordinates'



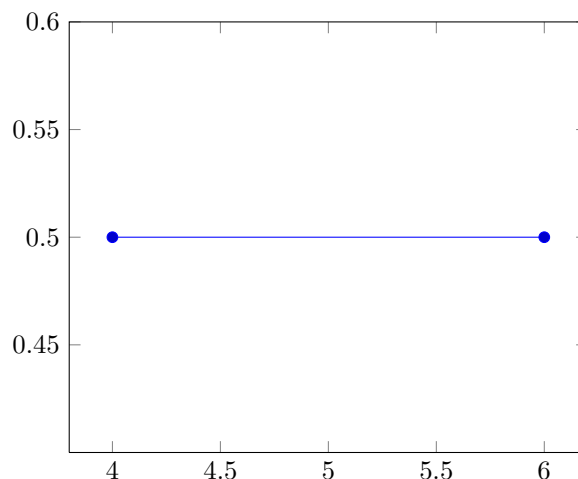
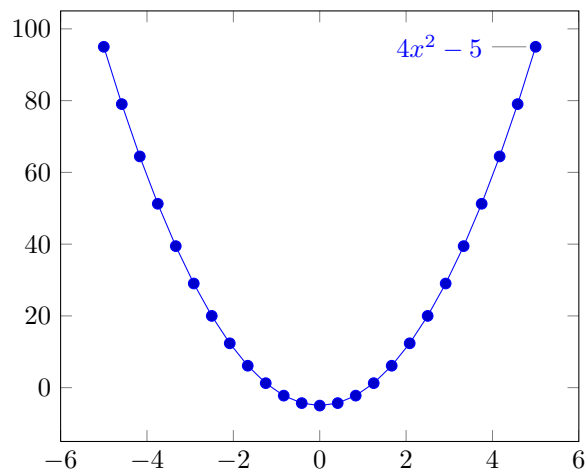
using closedcycle path



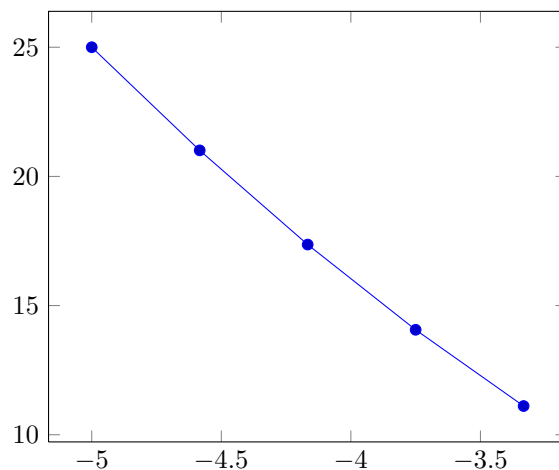
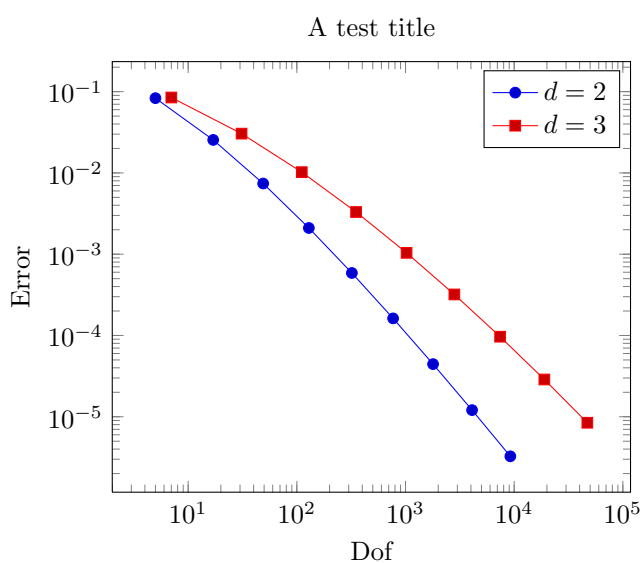
16.1.2 plot table



16.1.3 plot function

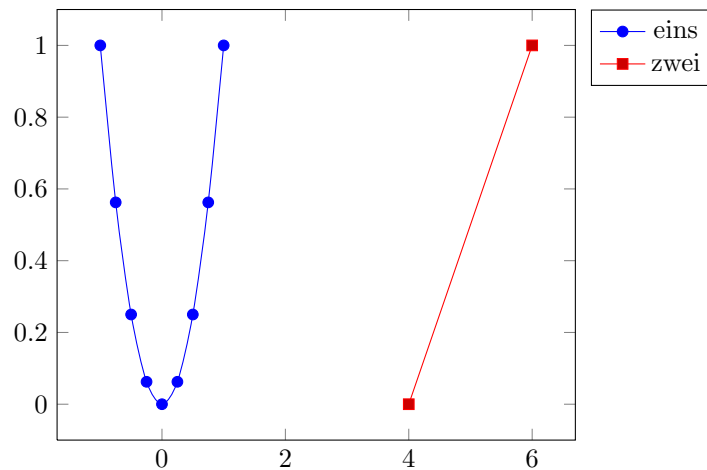


16.2 Title-option



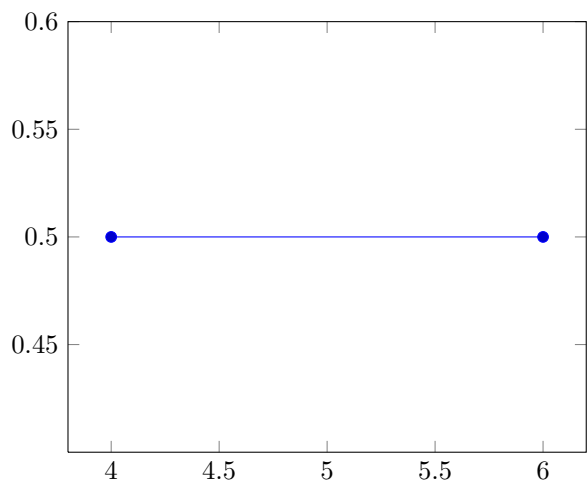
16.4 Test for addplot+[...]

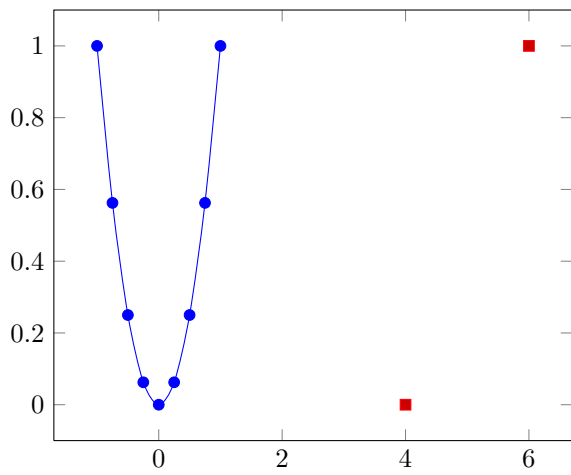
1. Ohne aenderung:



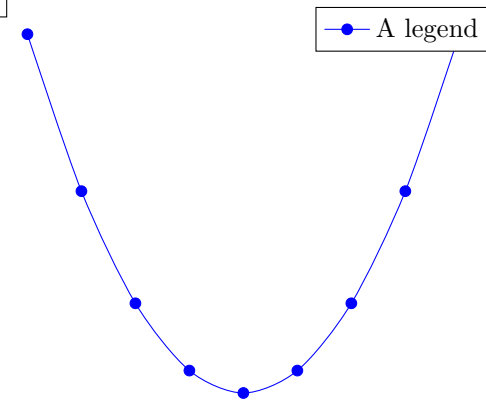
2. MIT aenderung:

16.3 Filter test

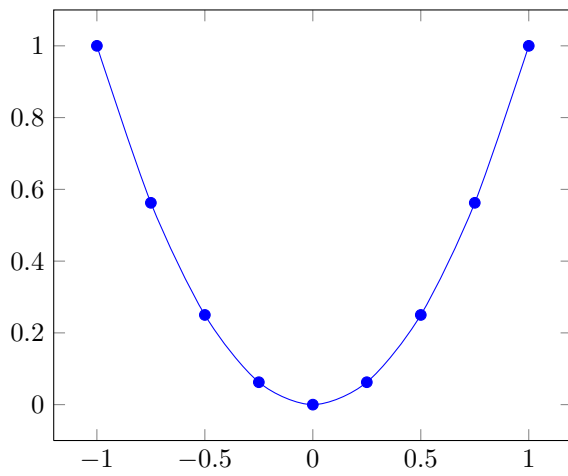




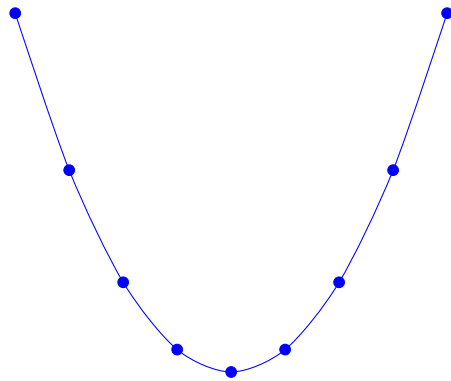
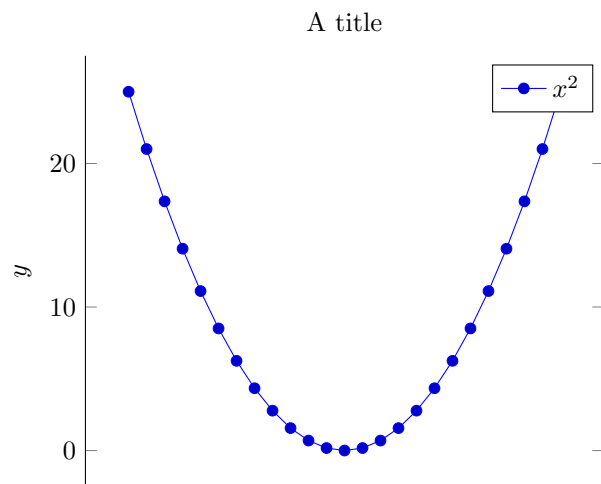
A plot with hidden axis



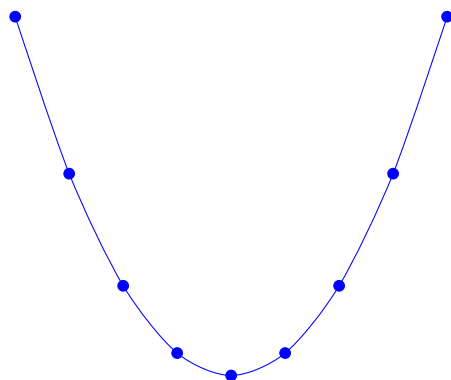
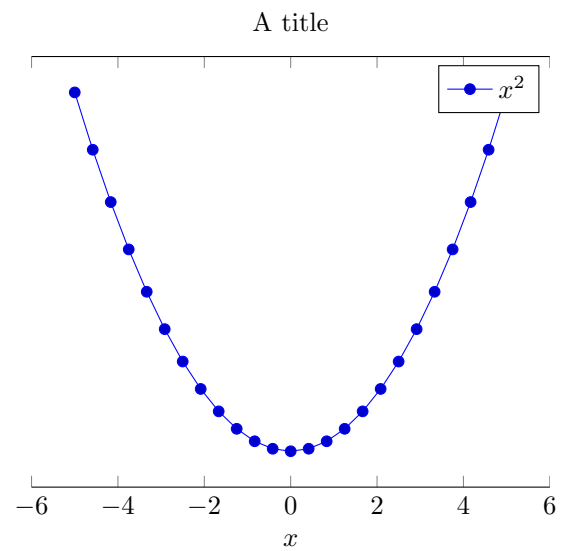
16.5 Hide axis test

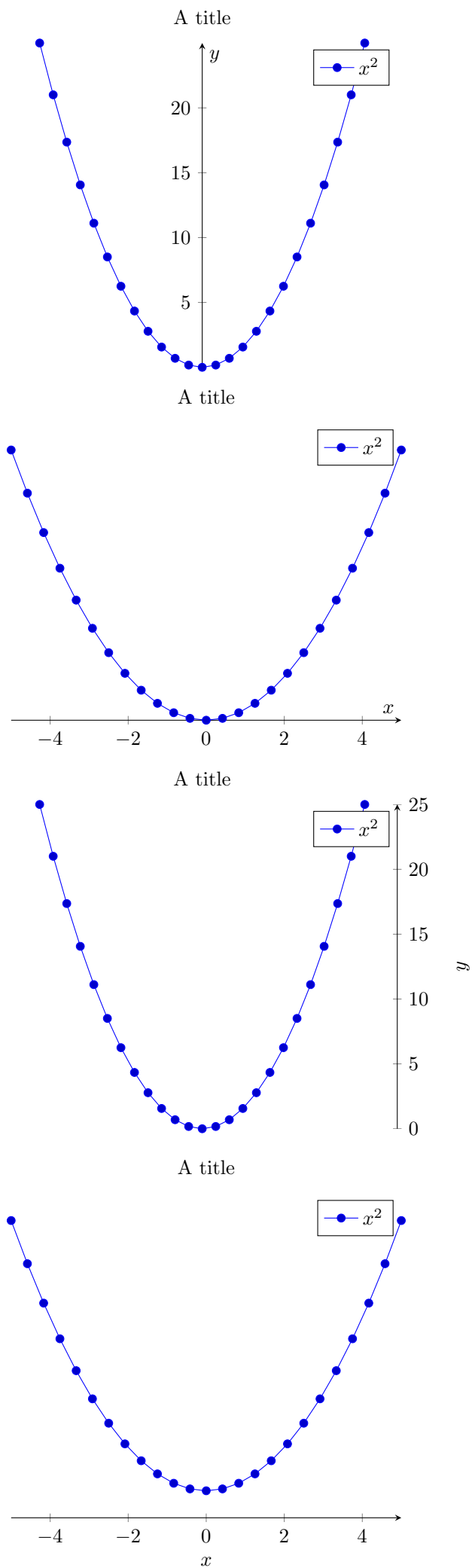


16.5.1 hide x/y axis



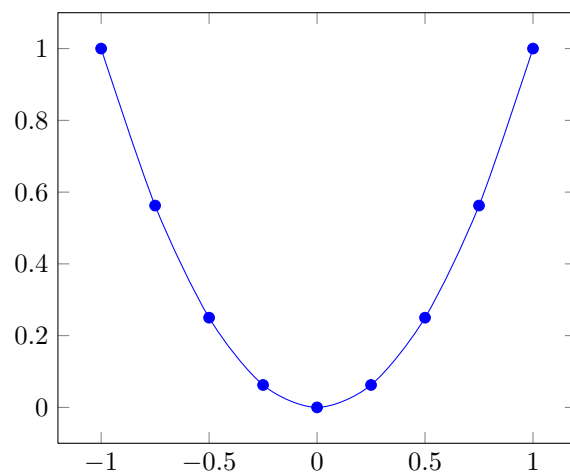
A plot with hidden axis



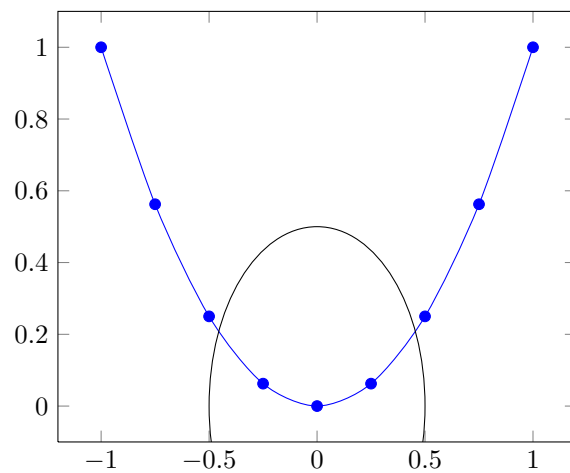


16.6 disabledatascaling / disablelog-filter

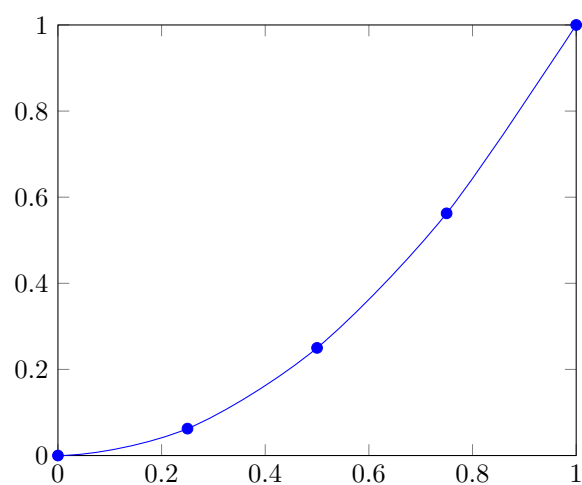
16.6.1 disabledatascaling



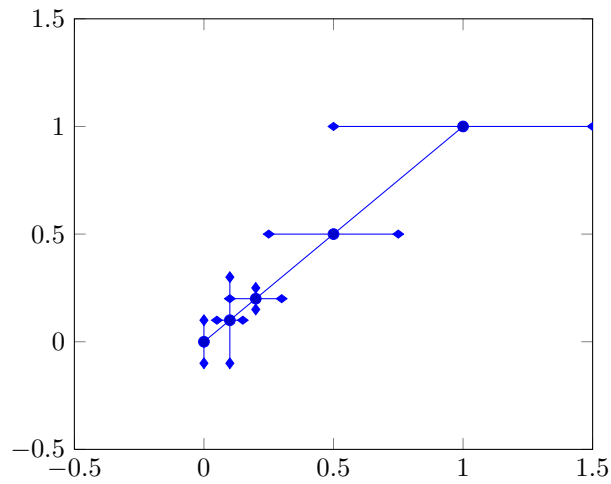
16.6.2 disabledatascaling+circle at (0,0) radius (0.5)



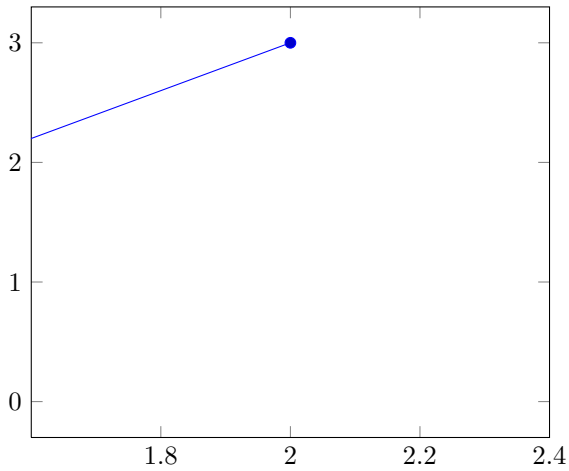
16.6.3 disabledatascaling + explicit limits



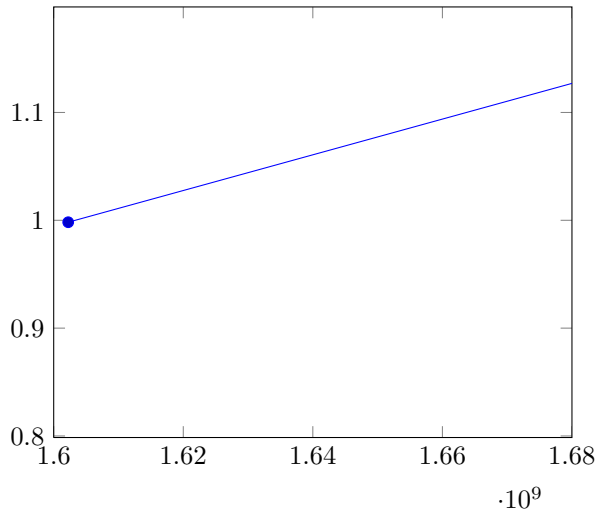
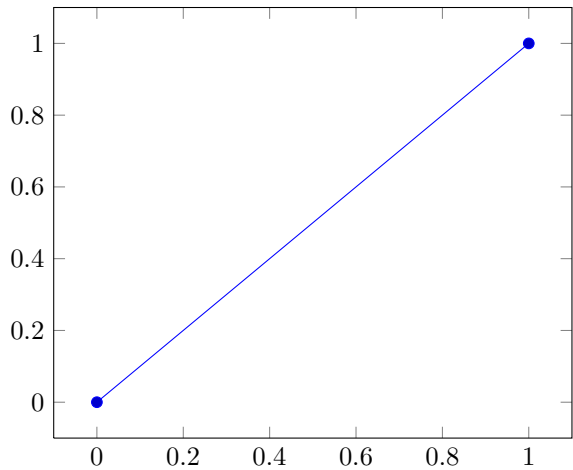
16.6.4 disabled datascaling + explicit limits + error bars



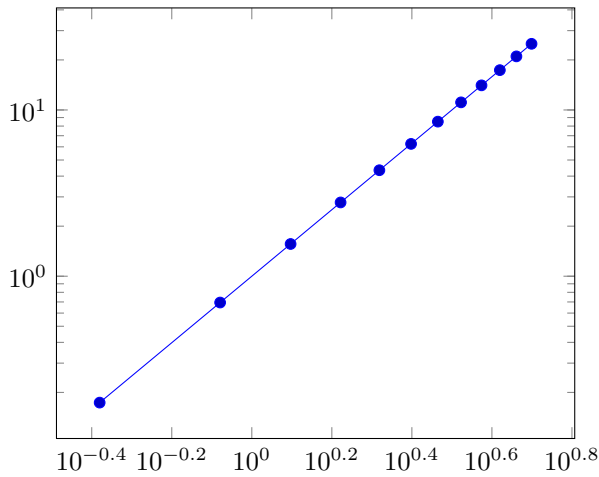
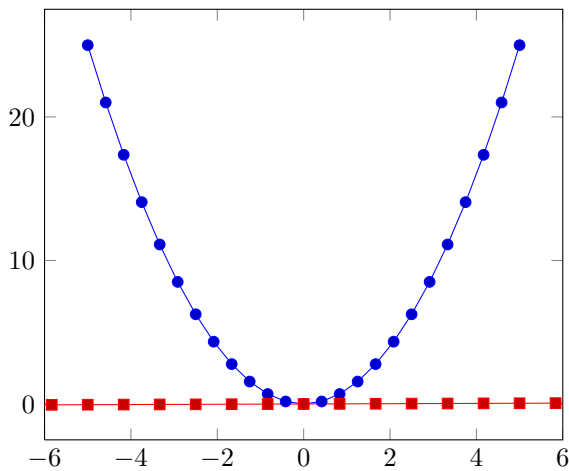
16.6.6 check for special limit cases



16.6.5 Reading nan und inf in linear axis



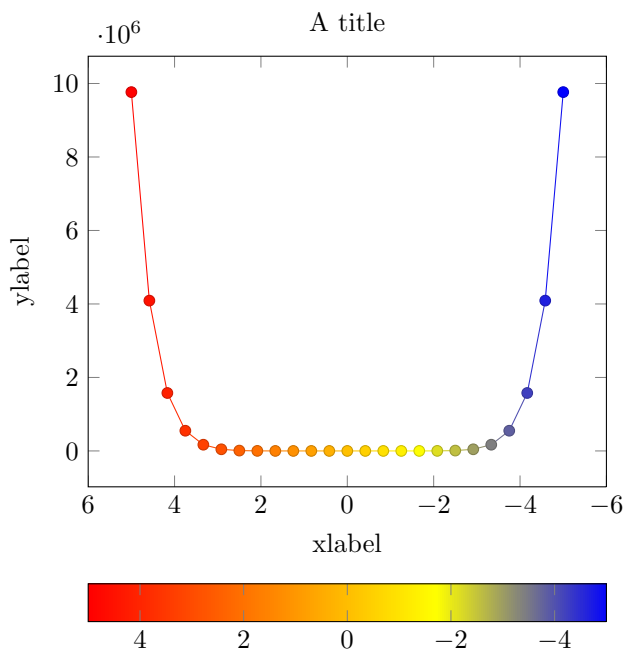
16.7 interrupt bounding box



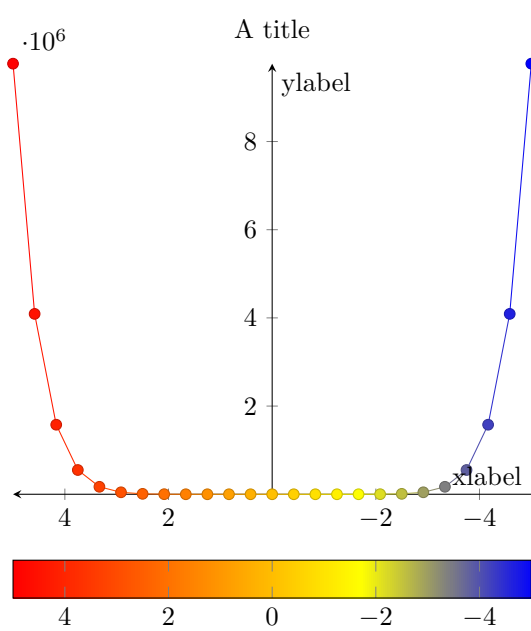
Chapter 17

pgfplotstest.reverseaxis.tex

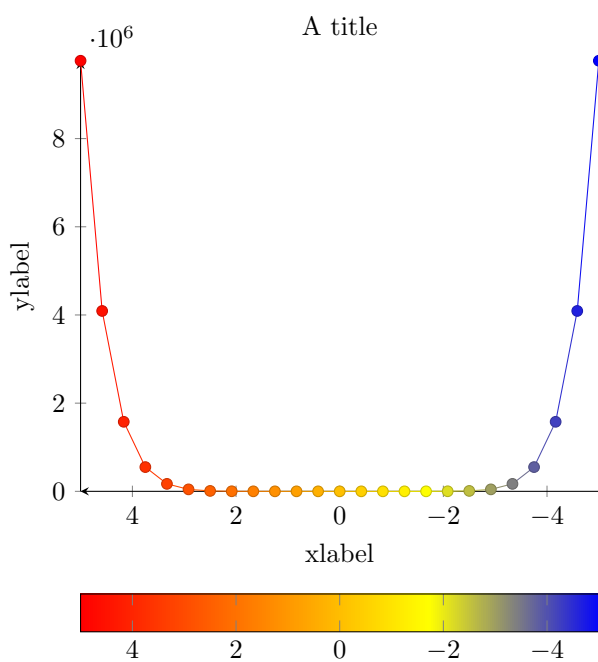
17.1 x dir=reverse



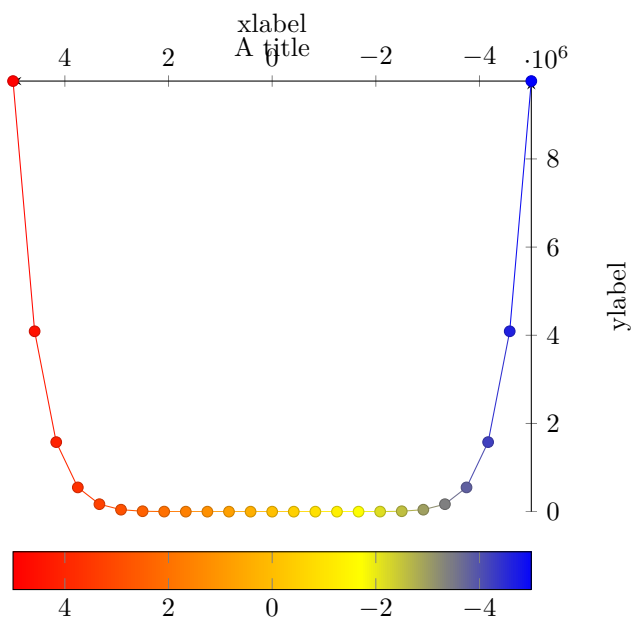
17.3 x dir=reverse,axis lines=center



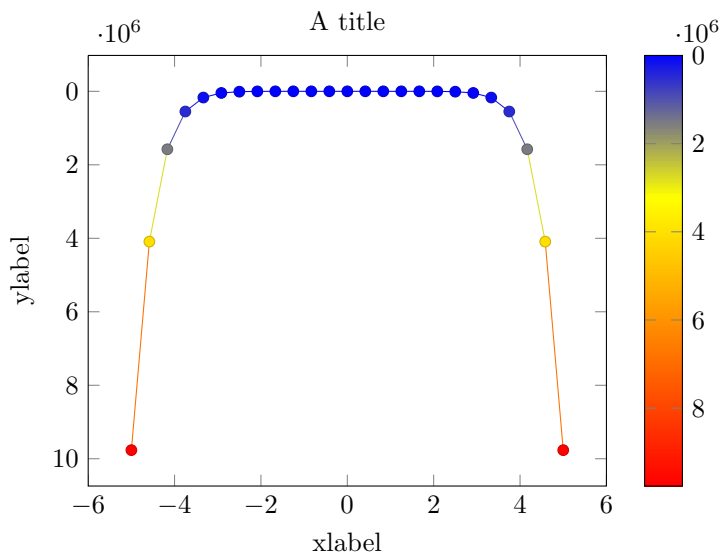
17.2 x dir=reverse,axis lines=left



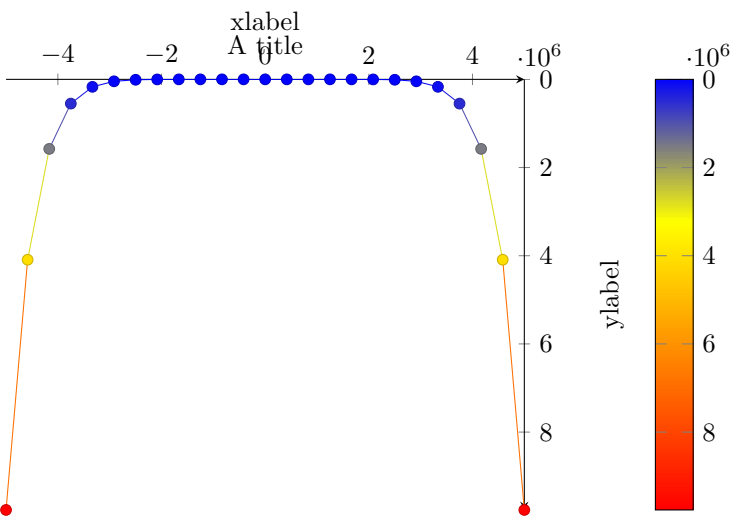
17.4 x dir=reverse,axis lines=right



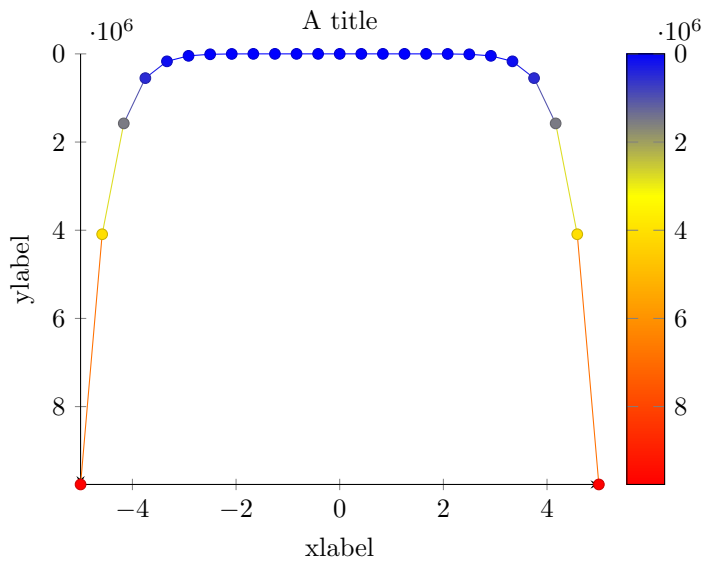
17.5 y dir=reverse



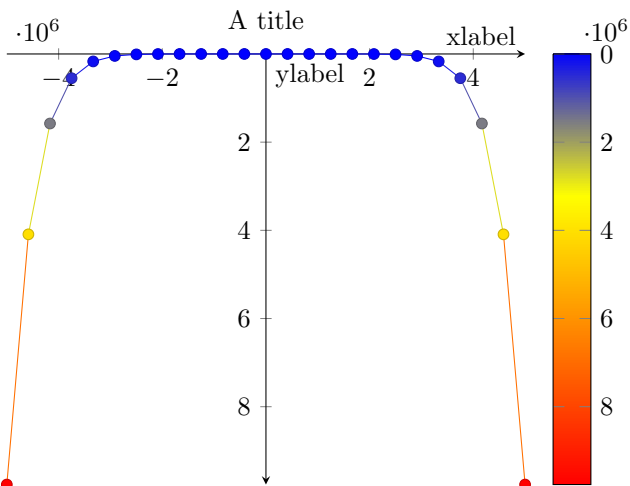
17.8 y dir=reverse,axis lines=right



17.6 y dir=reverse,axis lines=left



17.7 y dir=reverse,axis lines=center



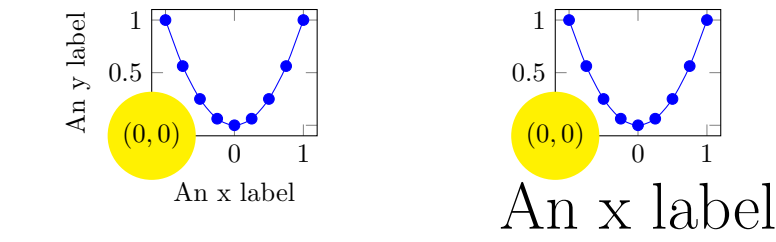
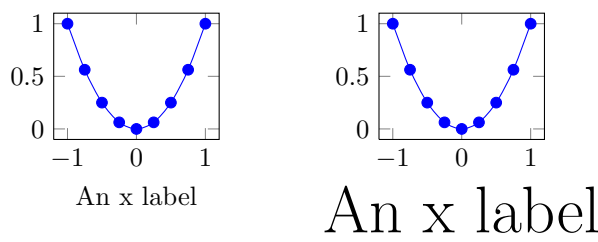
Chapter 18

pgfplotstest.align.tex

18.1 Anchors, alignment, baselines, sub nodes

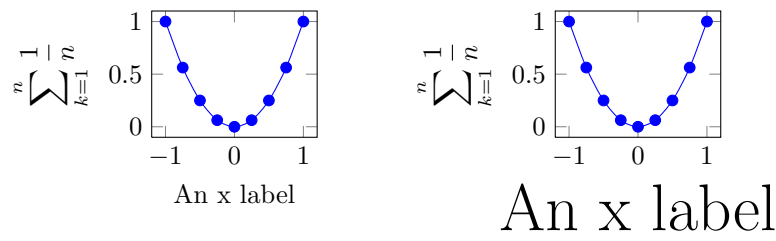
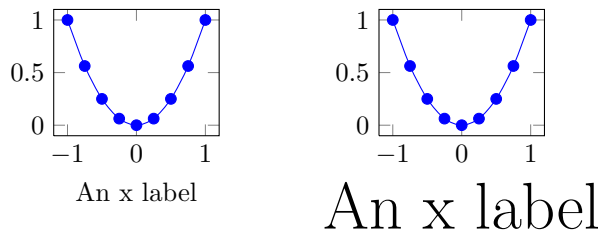
18.1.4 Horizontal and Vertical alignment

18.1.1 Baseline alignment

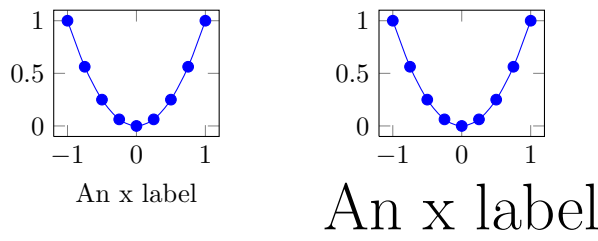


18.1.2 Baseline alignment and externalized graphics

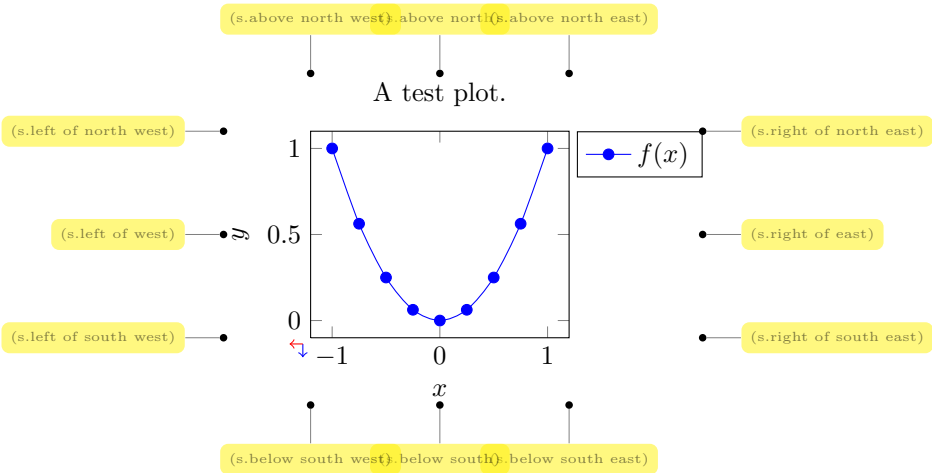
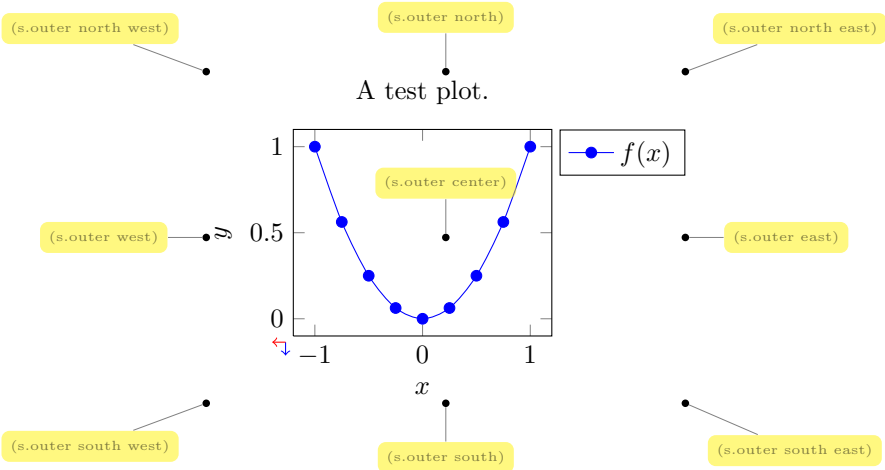
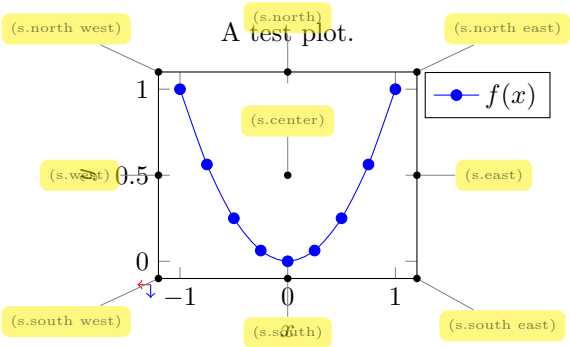
One needs `\beginpgfgraphicnamed` around the complete paragraph, so this here doesn't work (see source code):

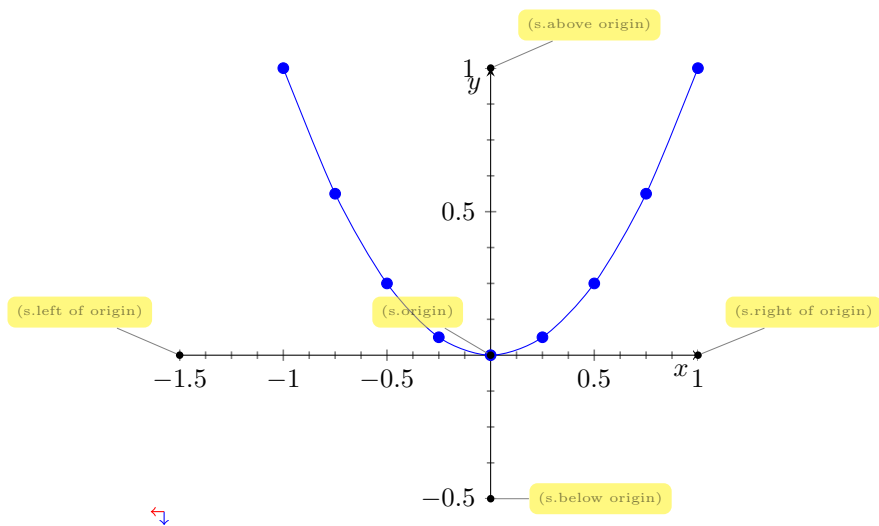


18.1.3 Baseline alignment and externalized graphics II

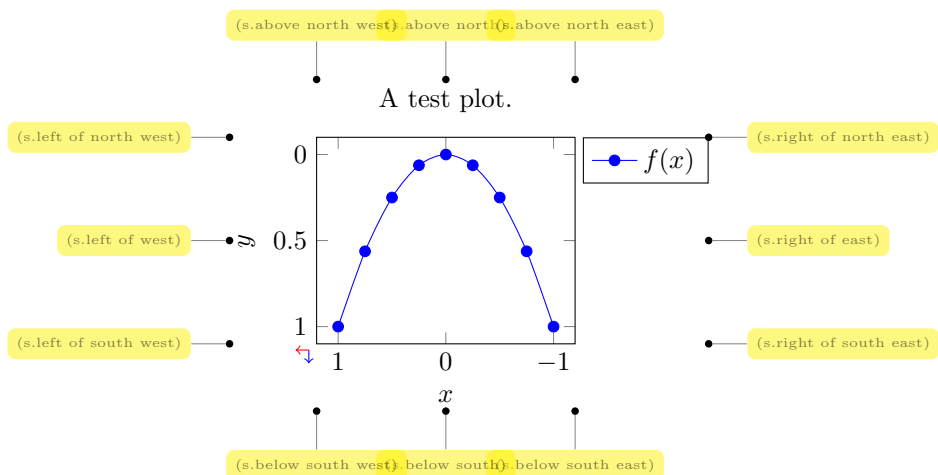
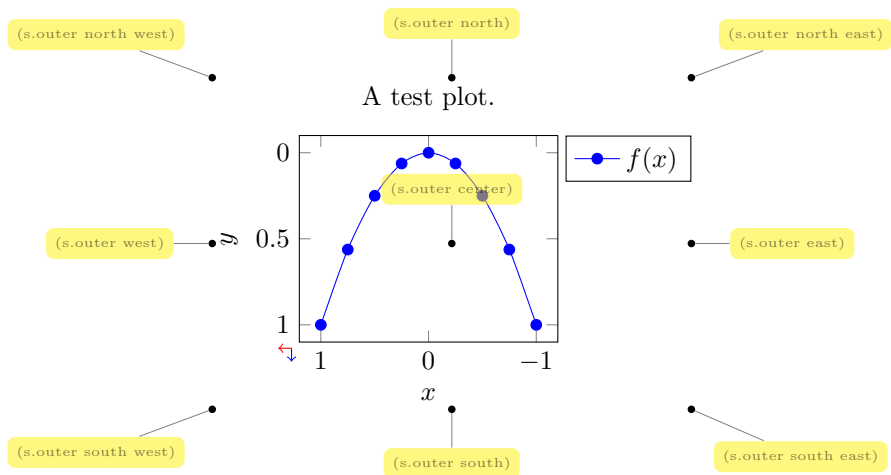
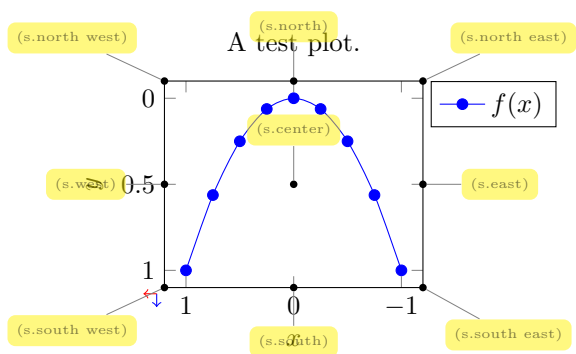


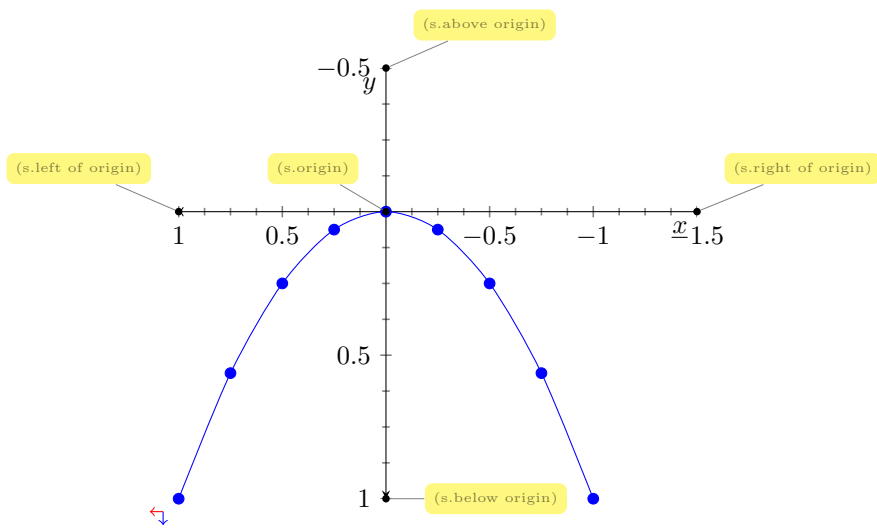
18.1.5 Anchortest



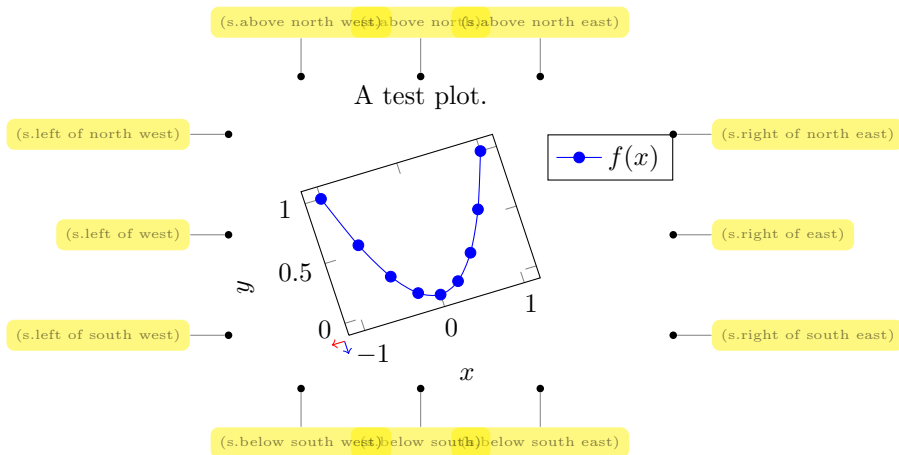
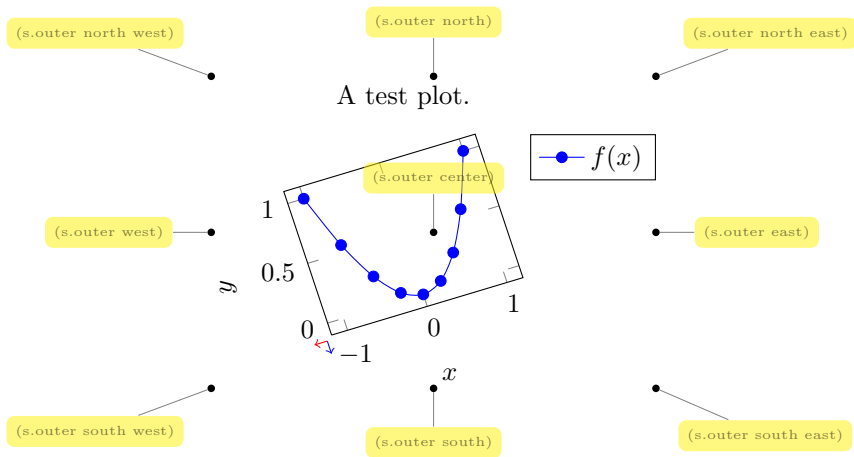
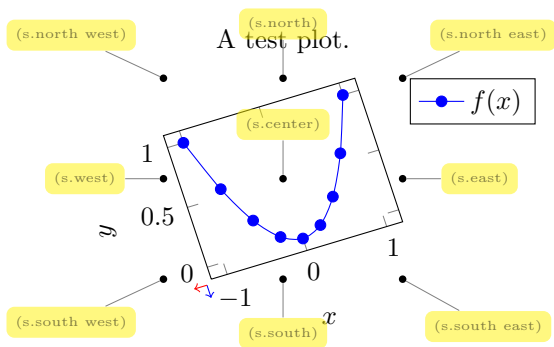


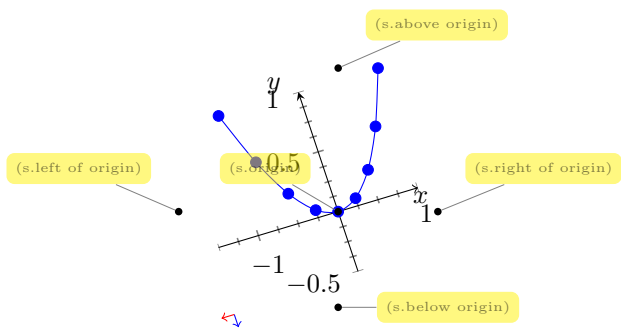
18.1.6 Reversed axes



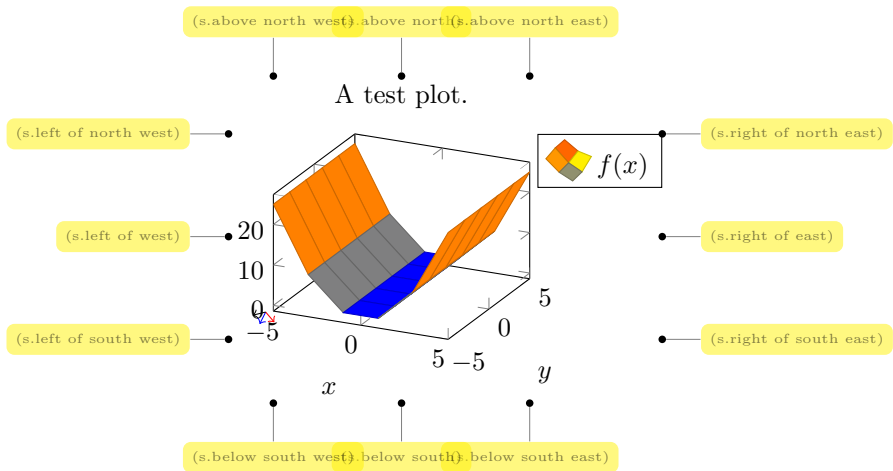
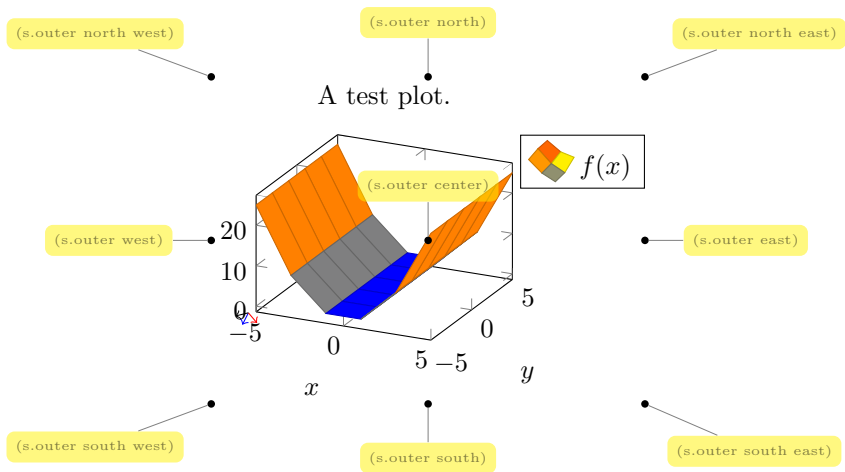
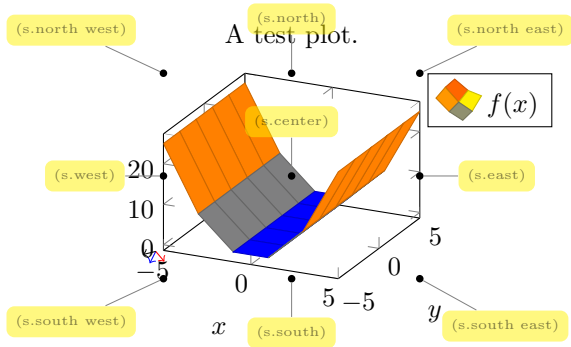


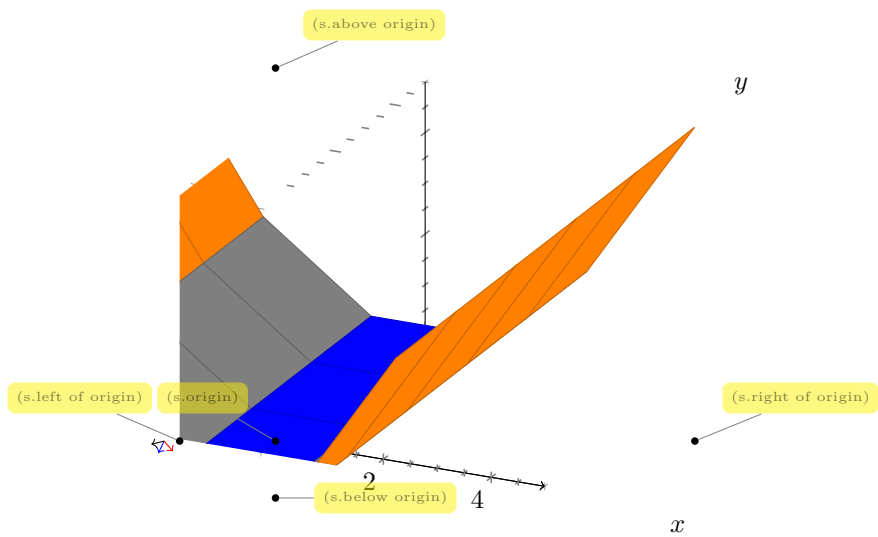
18.1.7 Using non-standard unit vectors



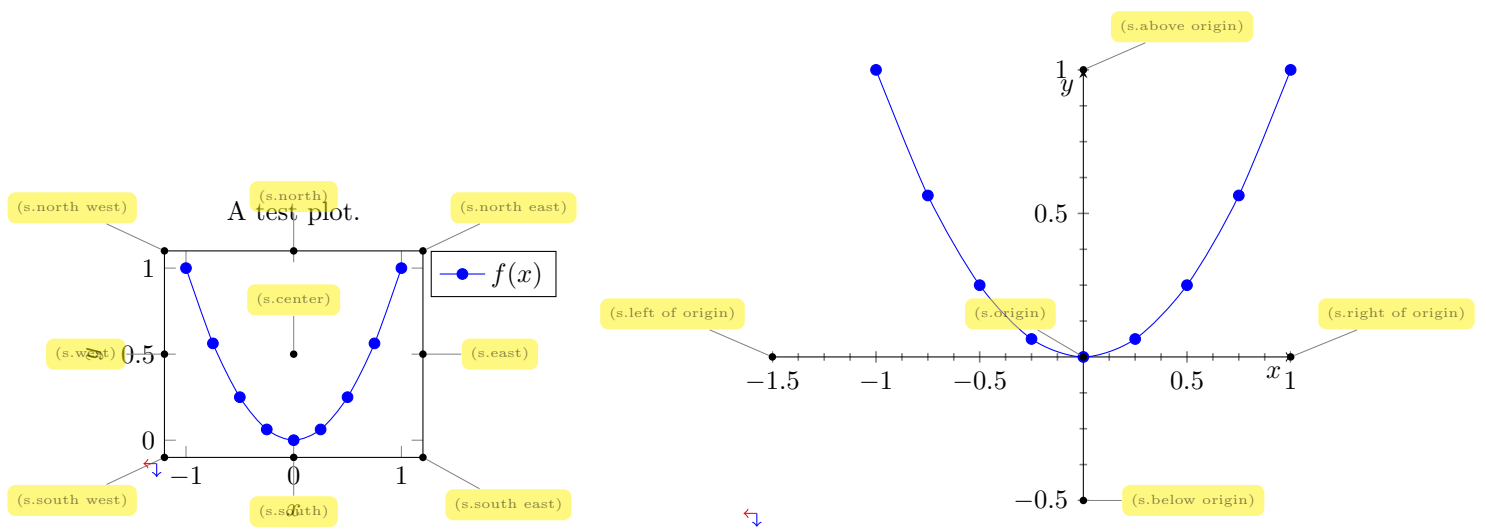


18.1.8 3D

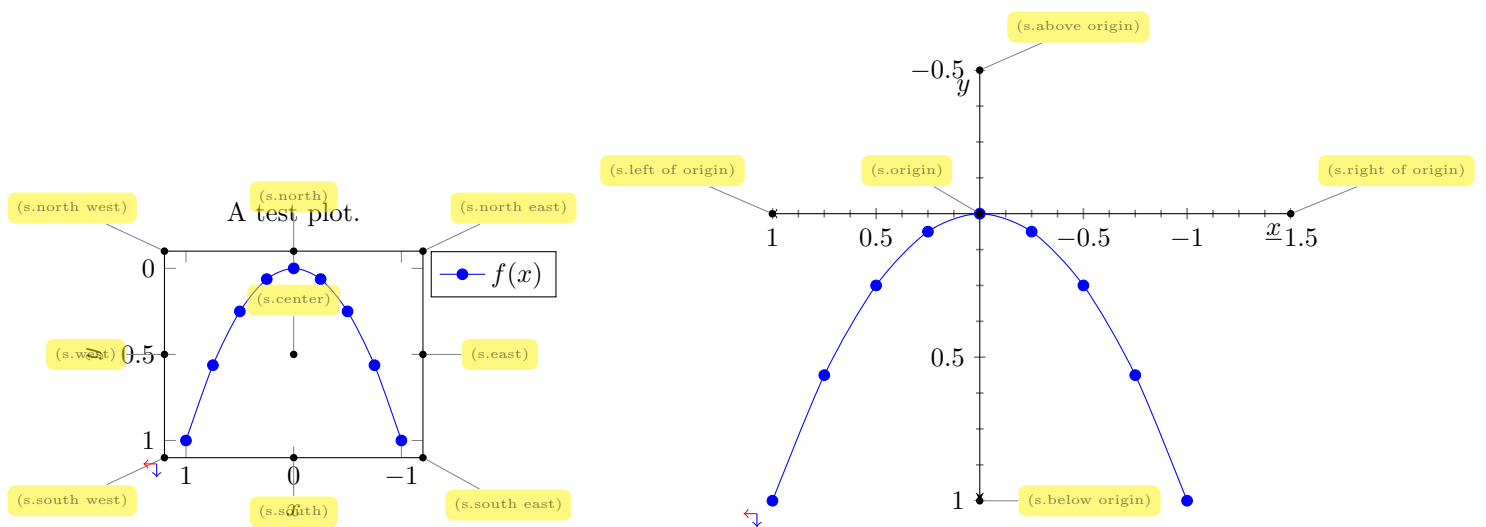




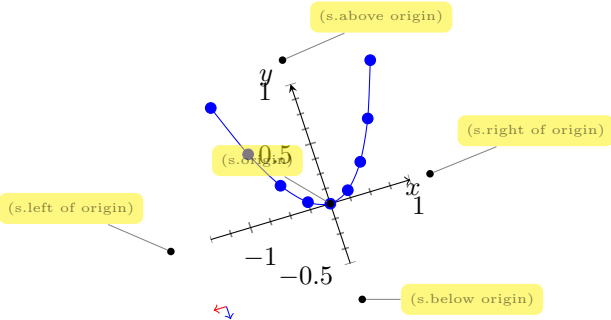
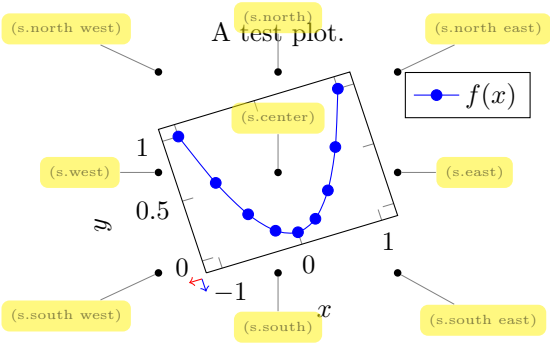
18.1.9 Using anchors before axis is finished



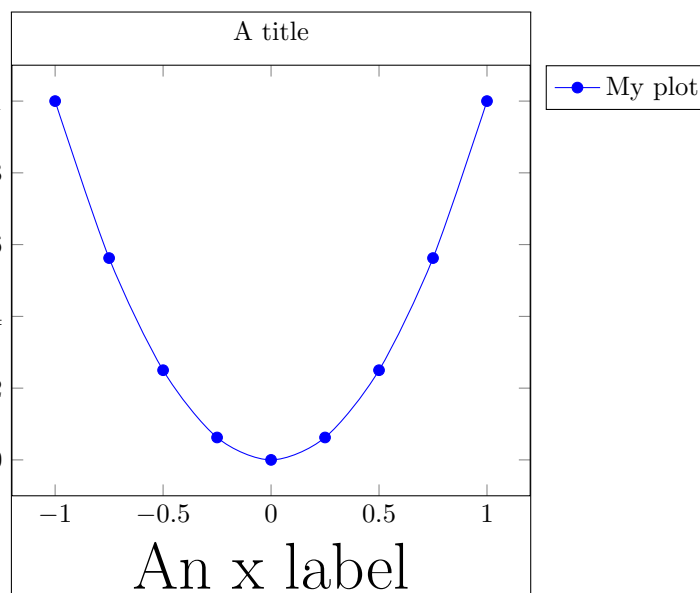
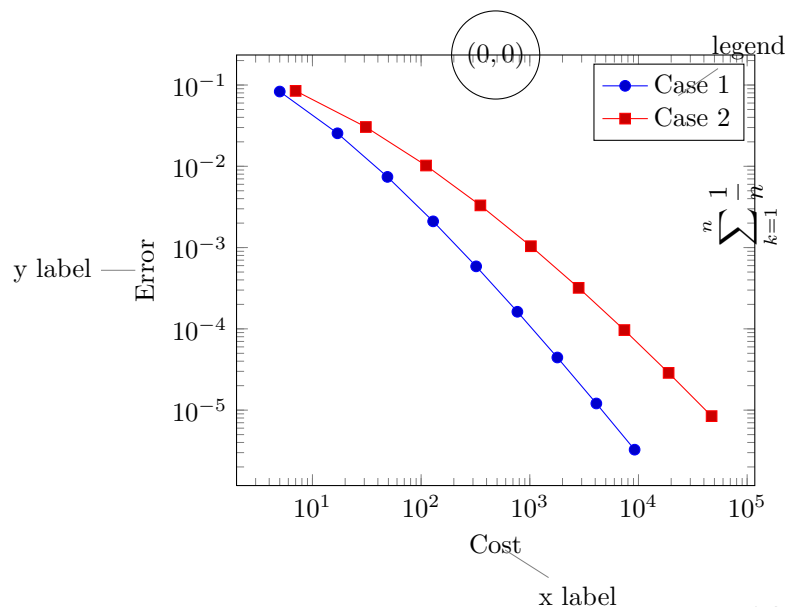
Reversed axes



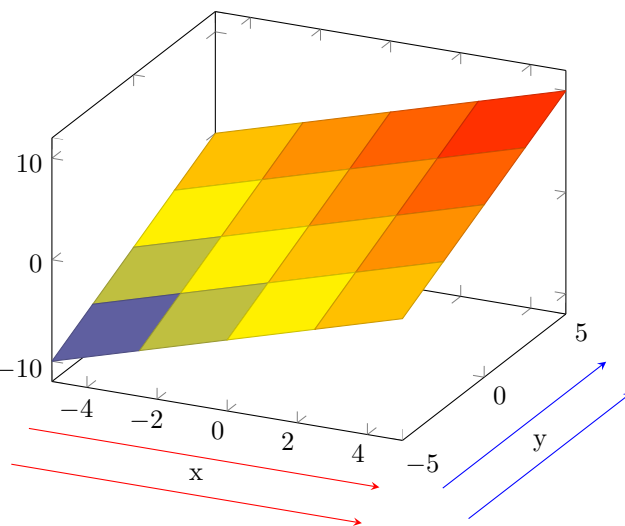
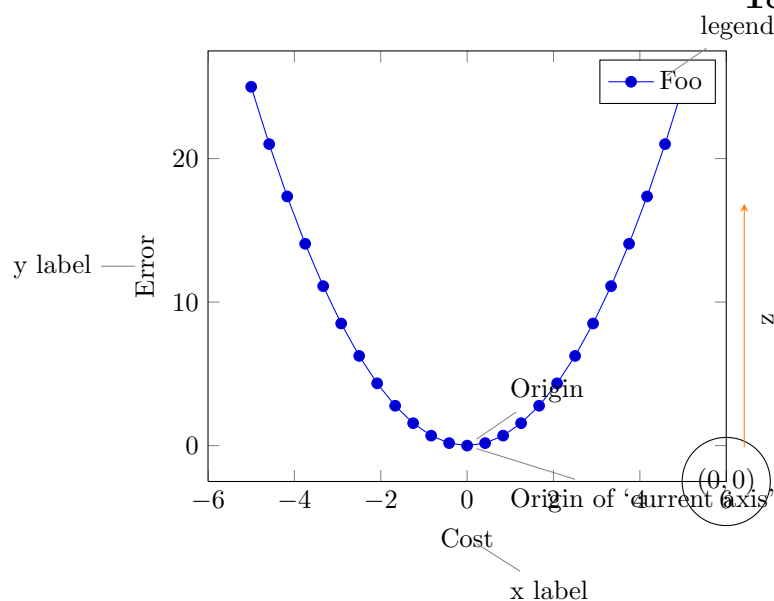
non-unit vectors



18.1.10 Accessing sub-nodes



18.2 ticklabel cs

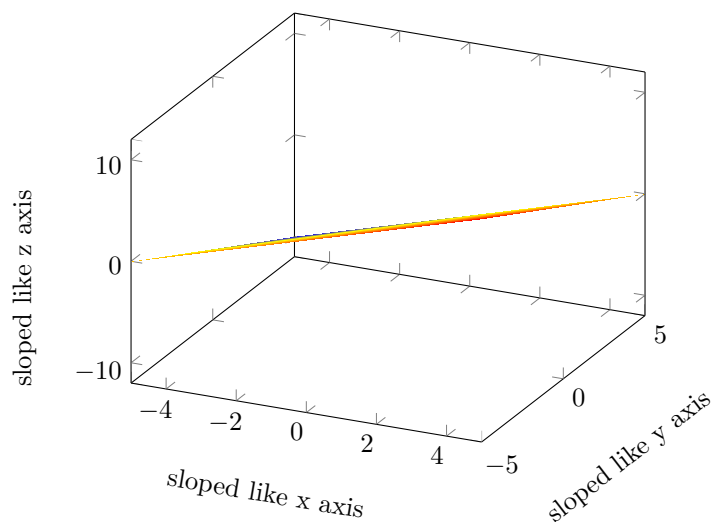


18.1.11 Funny bounding boxes

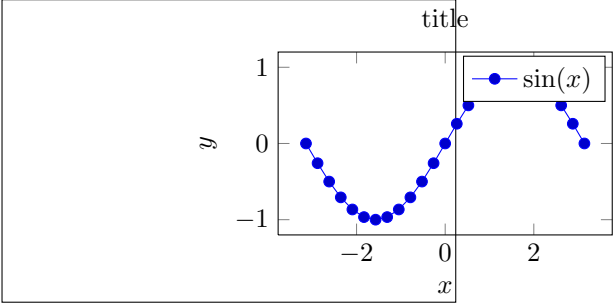
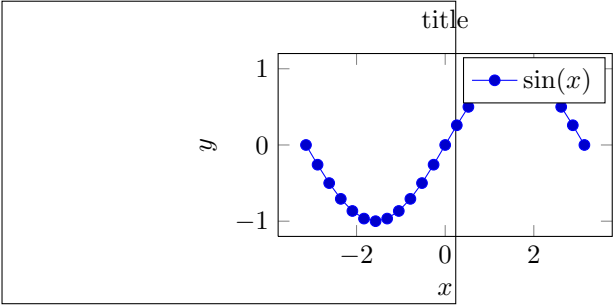
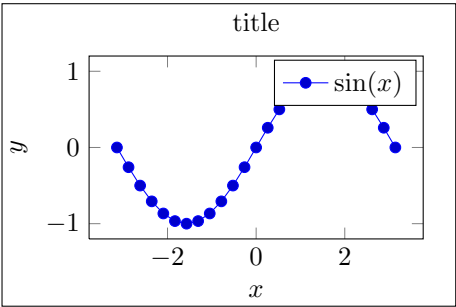
(my plot.below south west) rectangle (my plot.above north east)

The following figure is centered:

18.3 sloped like XXX axis



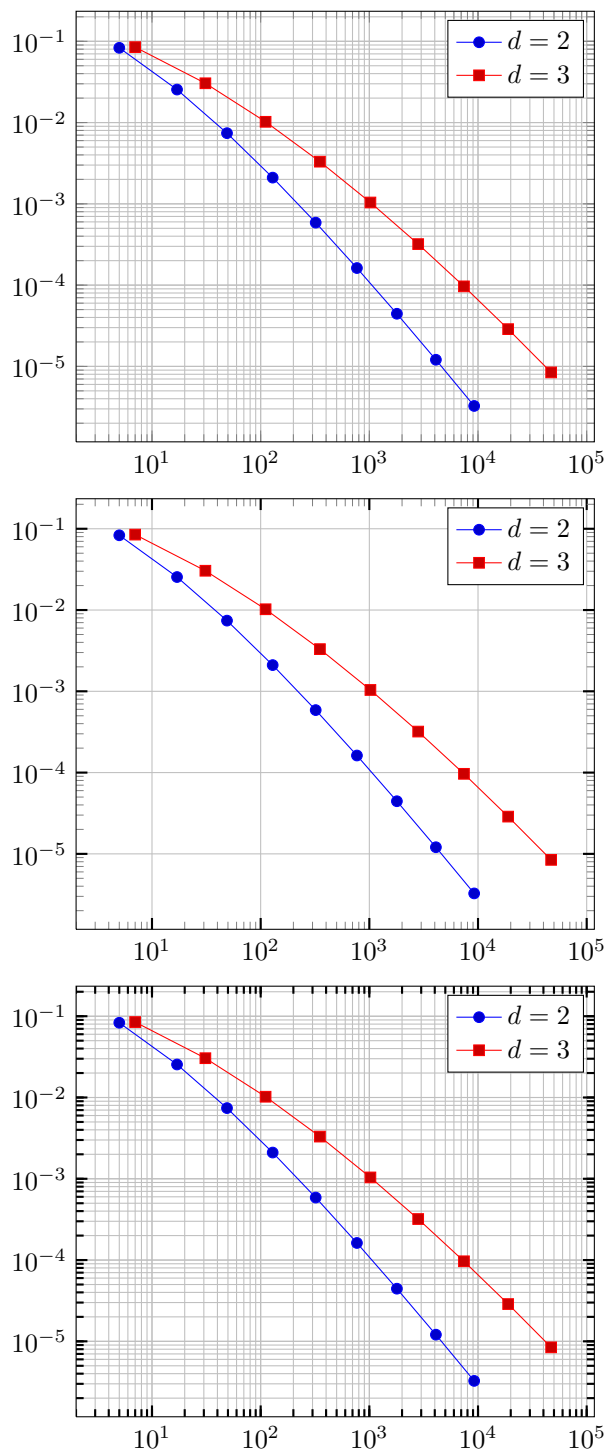
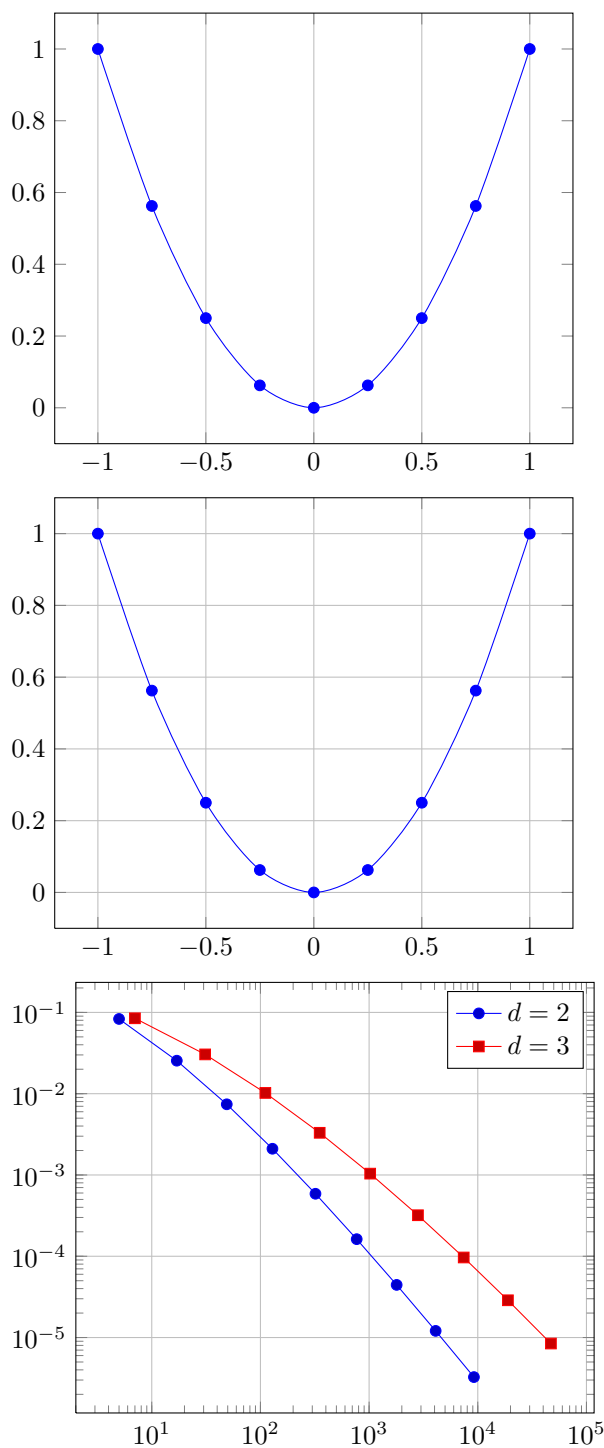
18.4 xyshift in axis and contained nodes



Chapter 19

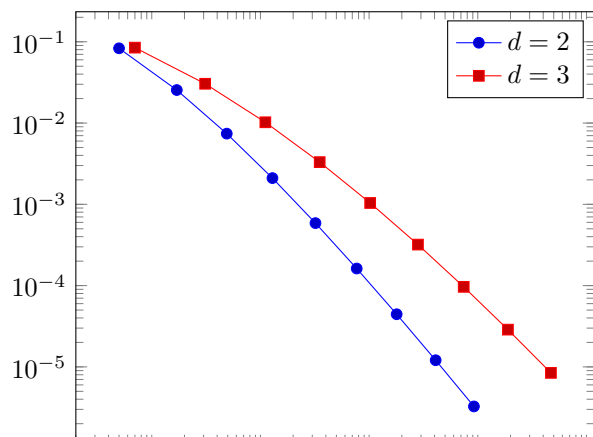
pgfplotstest.gridtick.tex

19.1 Grid lines test

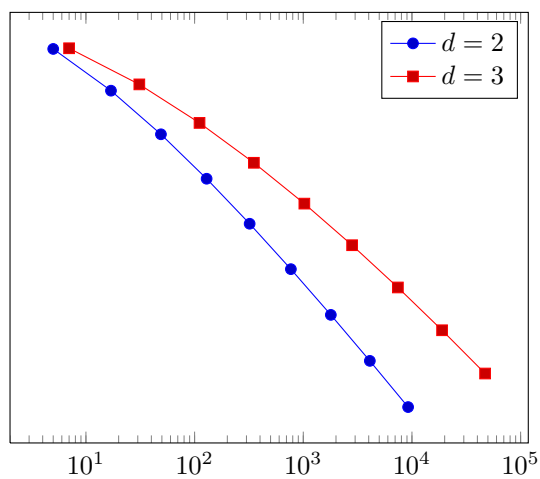


19.2 Tick lines test

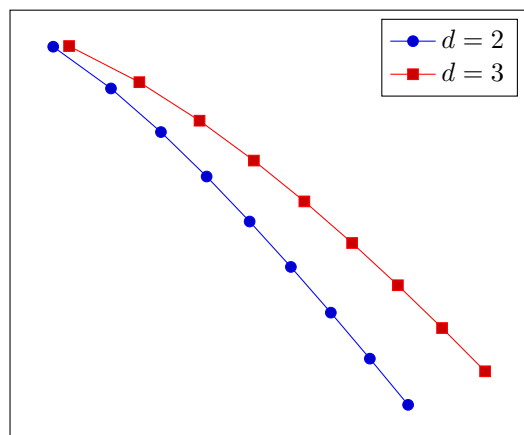
19.2.1 xmajorticks=false,xminorticks=true



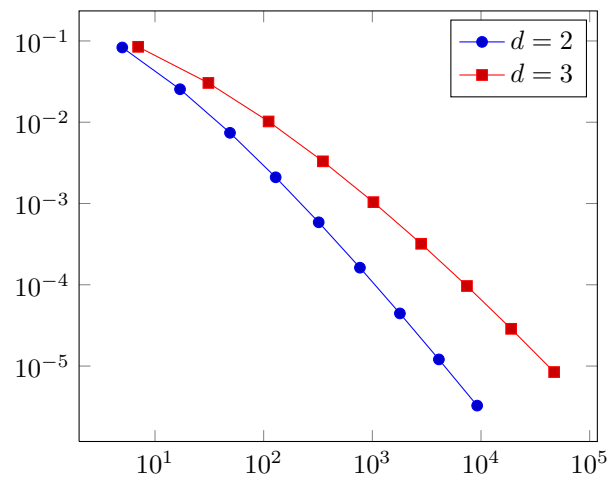
19.2.2 ymajorticks=false,yminorticks=false



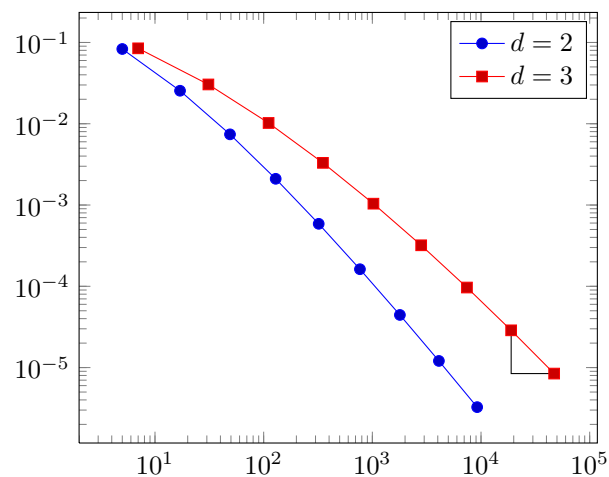
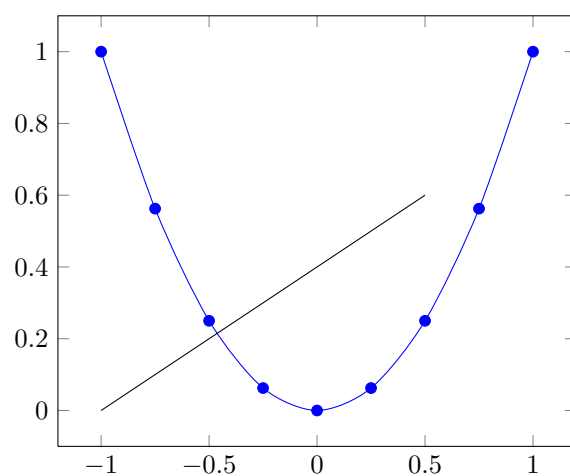
19.2.3 ticks=none



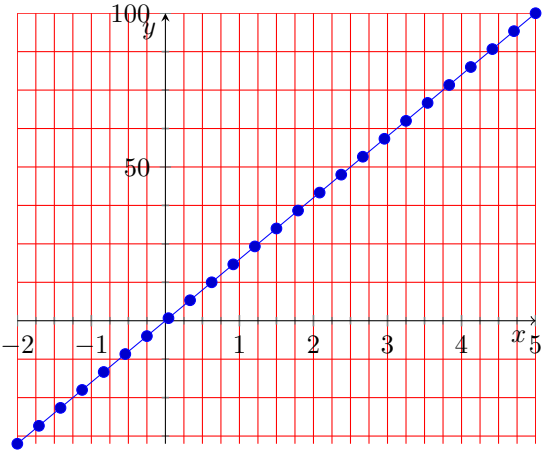
19.2.4 ticks=major



19.3 TikZ-coordinate system “axis”



19.4 Grid styles and axis line styles

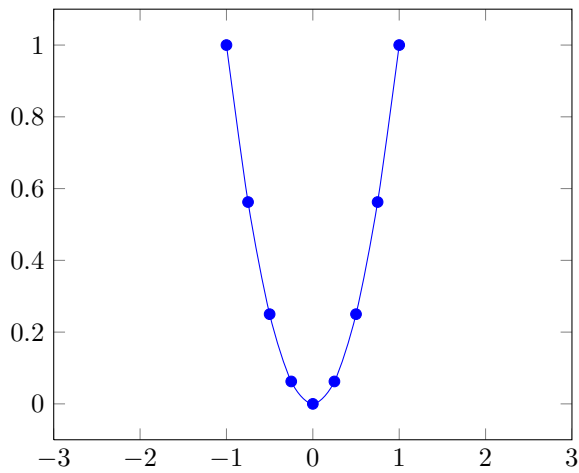


Chapter 20

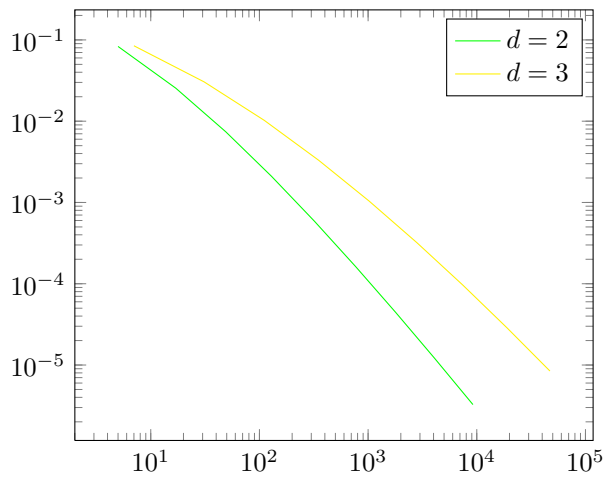
pgfplotstest.styles.tex

20.1 Style-tests

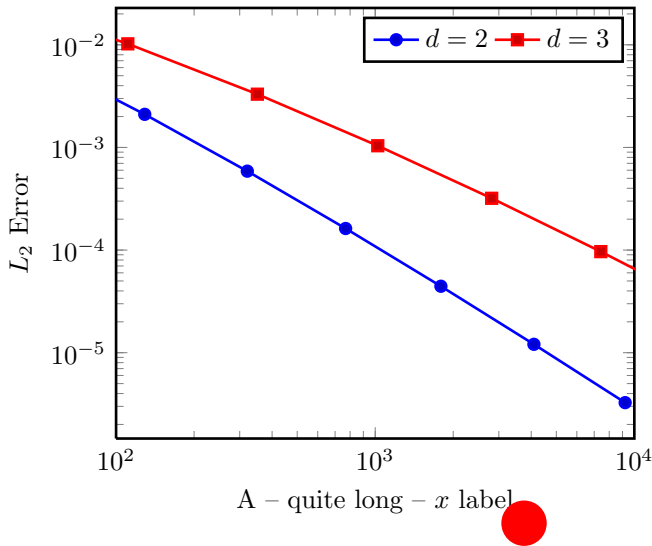
20.1.1 Limits in ‘every axis’; ‘cycle list’ option and ‘cycle list name’ option



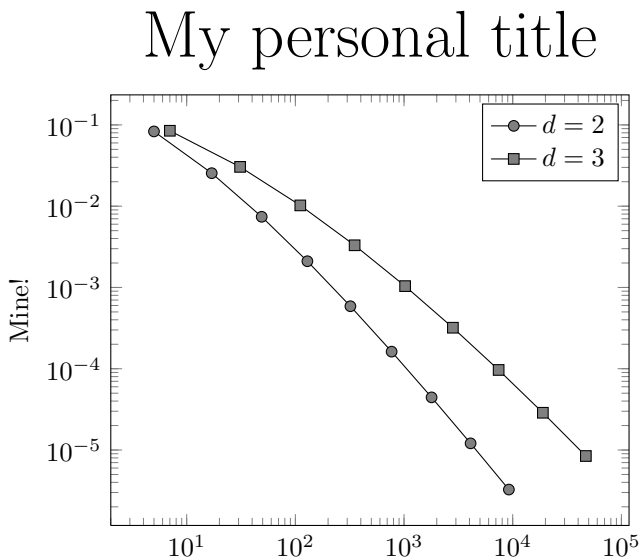
20.1.2 testing ‘every loglog axis’ style



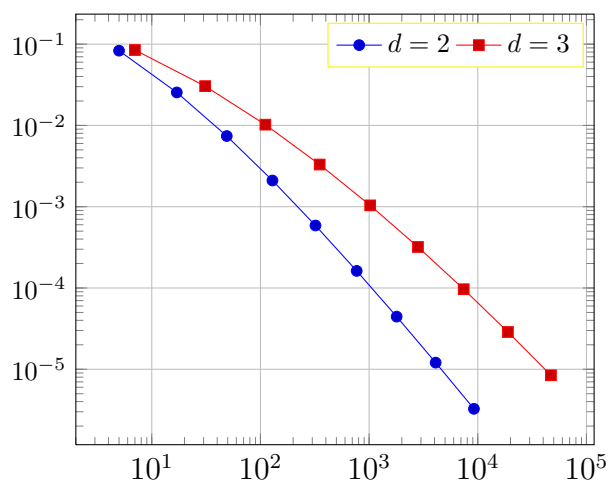
20.1.3 Using several ‘every ...’ styles



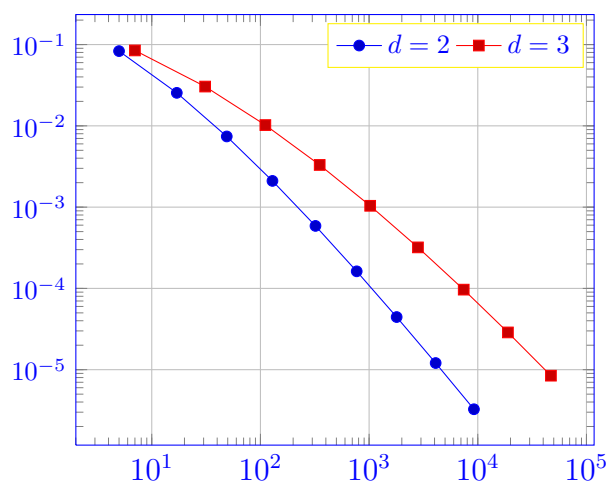
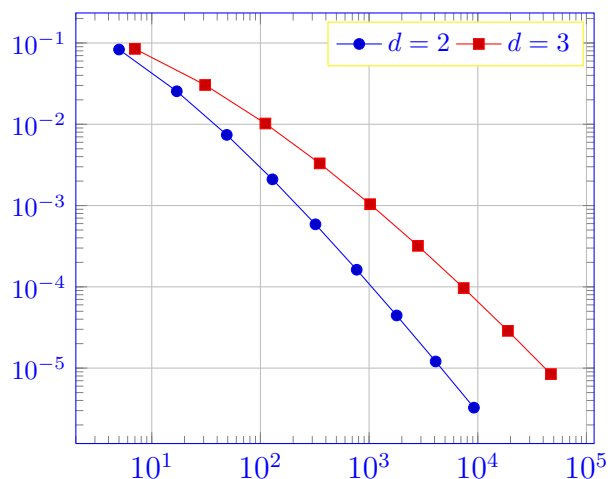
20.1.4 Using the ‘style=’ option



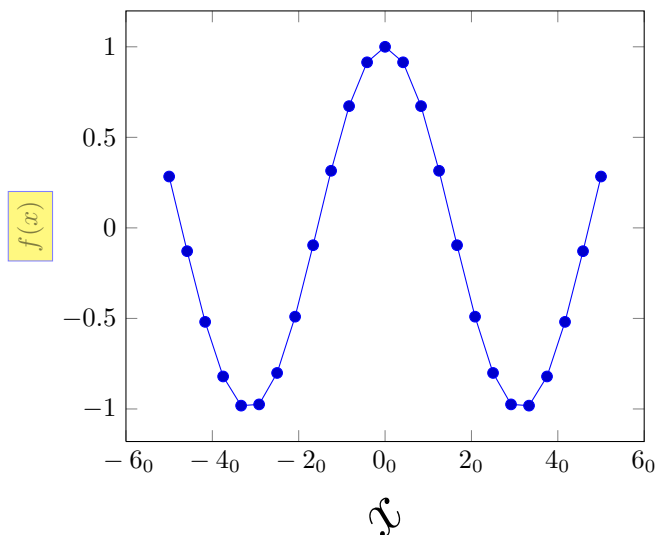
20.1.5 legend style, grid style, x label style etc. options



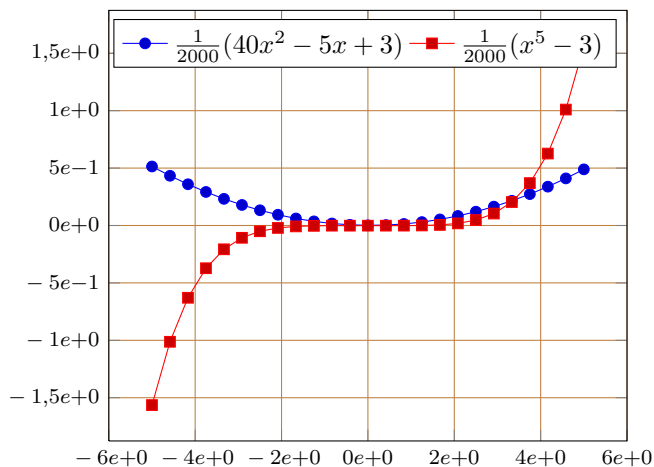
20.1.6 Providing TikZ-options to either tikzpicture or axis



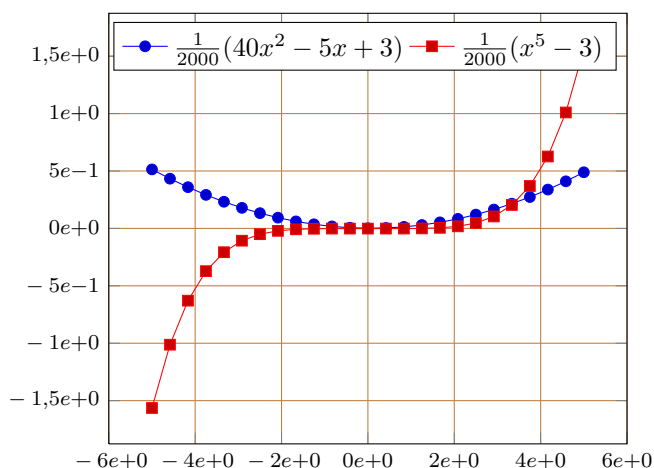
20.1.7 xlabel style and ylabel style



20.1.8 Collecting many options together

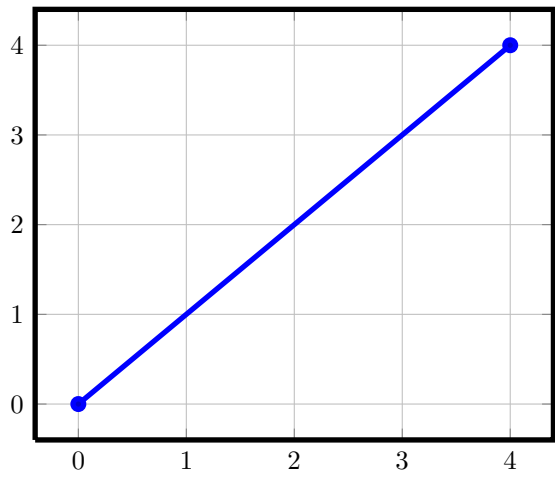


Putting the same options into a style...

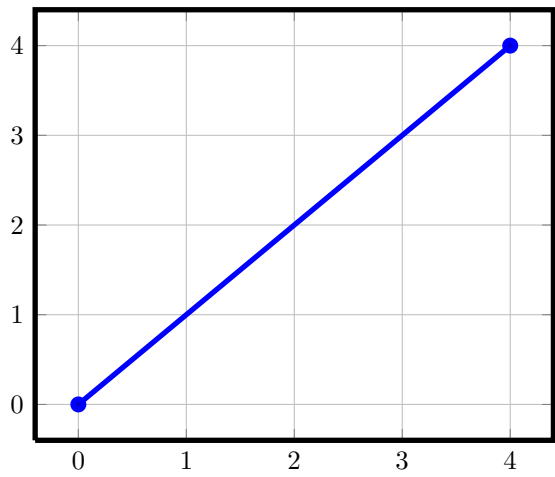


20.1.9 Line width

2pt global



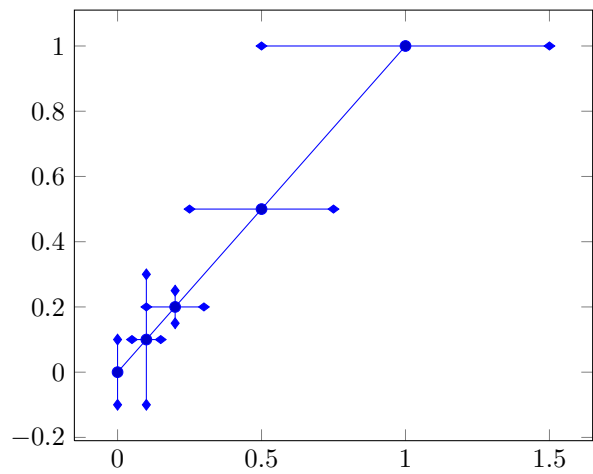
2pt in every axis



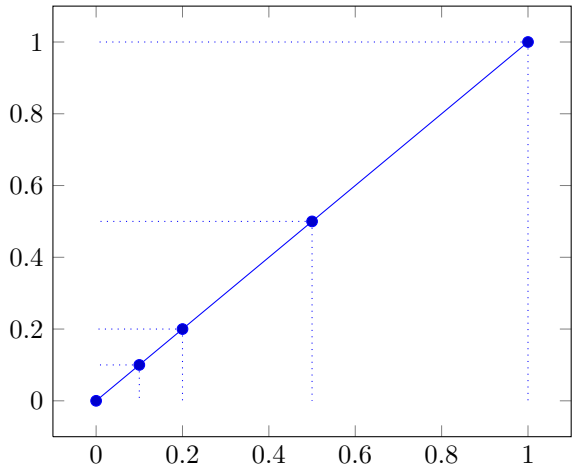
Chapter 21

pgfplotstest.errorbars.tex

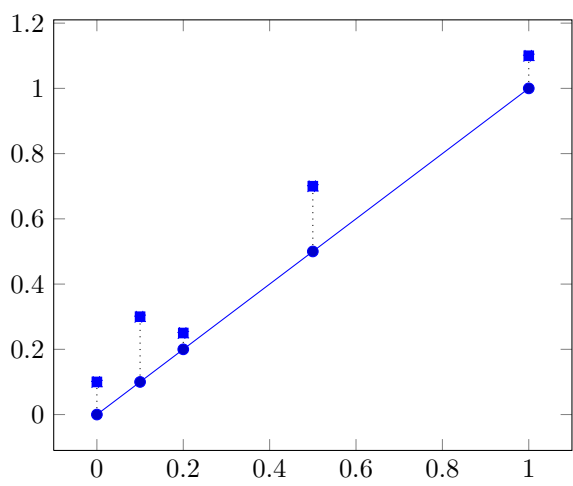
21.1 Errorbars



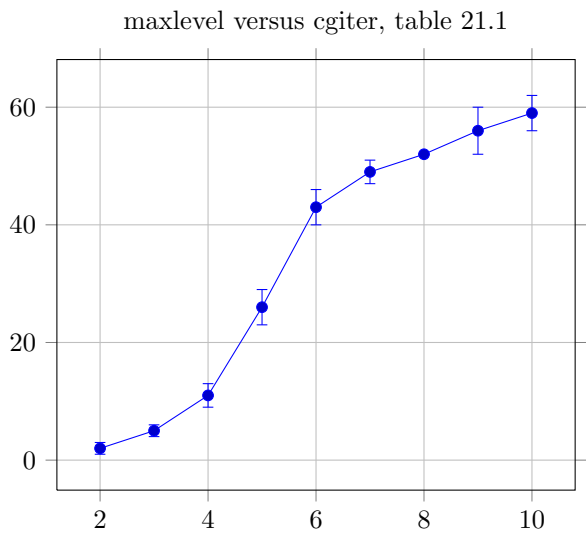
using 100% minus



changing styles



with plot table

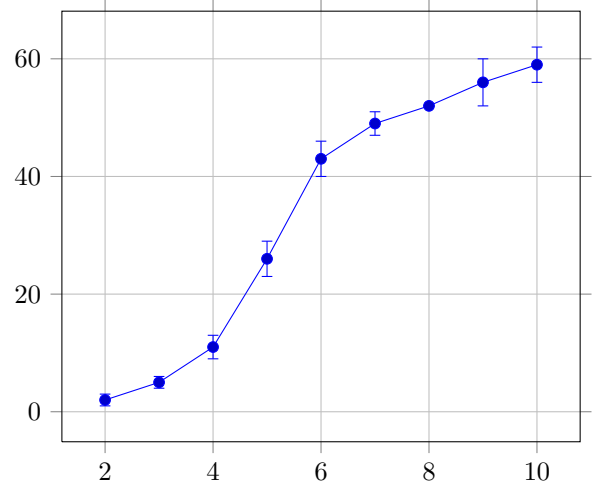


1	G	Basis	dof	l2	l2_abserror	A	lmax	lmax_relerror	cgiter	cgiter_err	maxlevel	eps
2	\$flags_int	int	int	sci:8	sci:8	sci:8	sci:8	sci:8	int	sci:8	int	std:8
3	5	5	5	8.31160034e-02	1e-2	0.00000000e+00	1.80007647e-01	0.00000000e+00	2	1	2	1
4	17	17	17	2.54685628e-02	0	0.00000000e+00	3.75580565e-02	0.02	0.7	1	3	1
5	49	49	49	7.40715288e-03	5e-3	0.00000000e+00	1.49212716e-02	0.5	11	2	4	1
6	129	129	129	2.10192154e-03	1e-1	0.00000000e+00	4.23330523e-03	0.9	26	3	5	1
7	321	321	321	5.87352989e-04	0	0.00000000e+00	1.30668515e-03	0.2	43	3	6	1
8	769	769	769	1.62269942e-04	1e-4	0.00000000e+00	3.88658098e-04	0.25	49	2	7	1
9	1793	1793	1793	4.44248889e-05	1e-5	0.00000000e+00	1.12651668e-04	0.4	52	0	8	1
10	4097	4097	4097	1.20714122e-05	0.5e-5	0.00000000e+00	3.20339285e-05	0.3	56	4	9	1
11	9217	9217	9217	3.26101452e-06	0.7e-6	0.00000000e+00	8.97617707e-06	0.5	59	3	10	1

Table 21.1: The table used for the plot table tests and error bars.

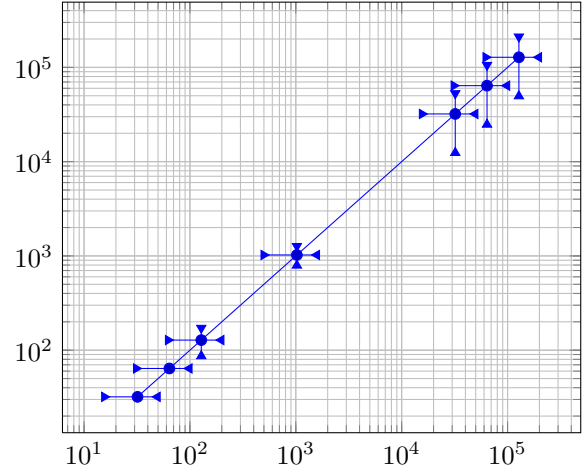
with plot table from macro

maxlevel versus cgiter, table 21.1

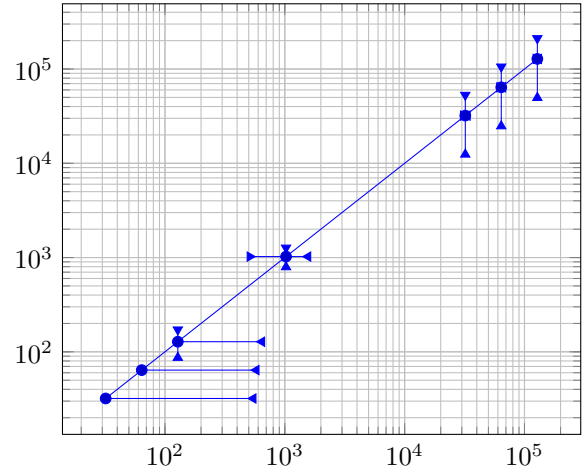


21.1.1 Log-plot

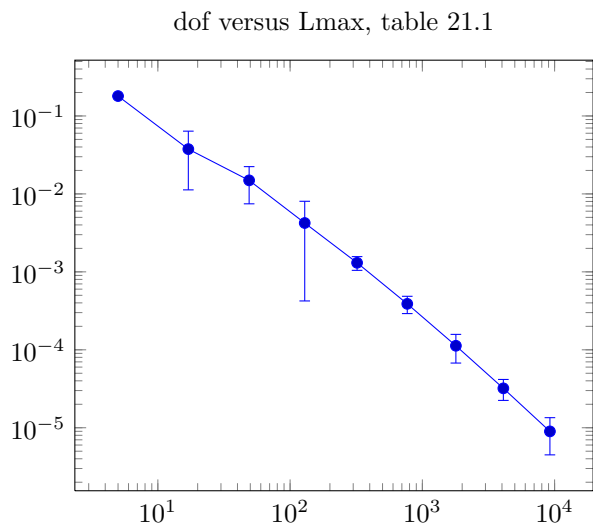
relative errors



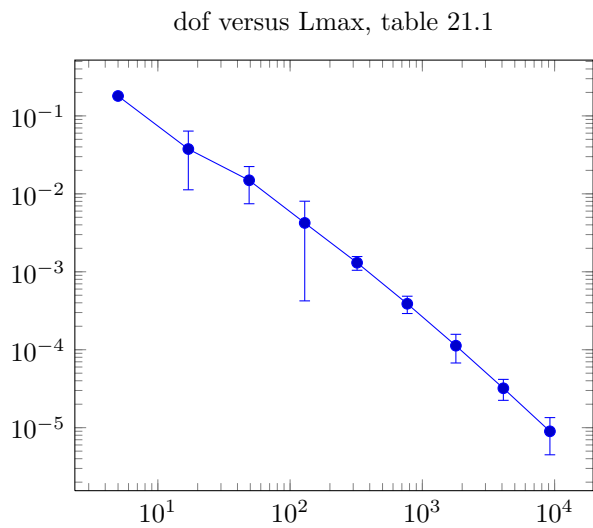
x fixed=500, y explicit relative



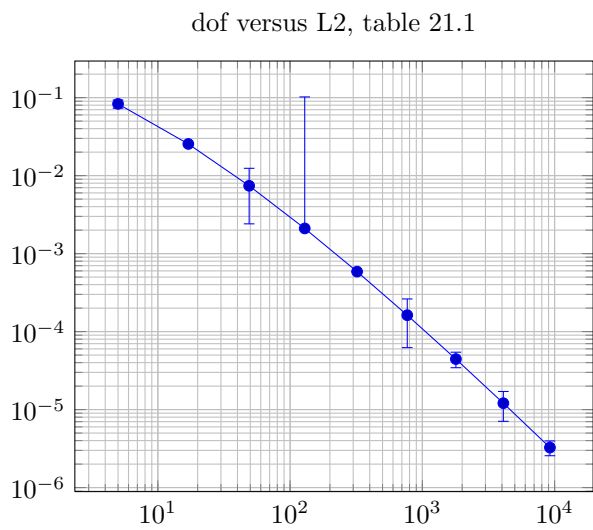
with plot table



with plot table from macro



with plot table absolute

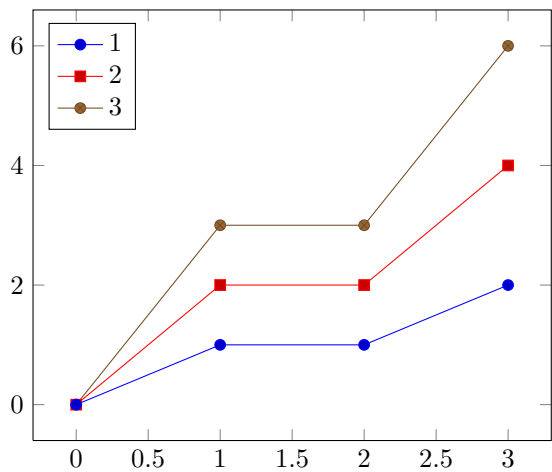


Chapter 22

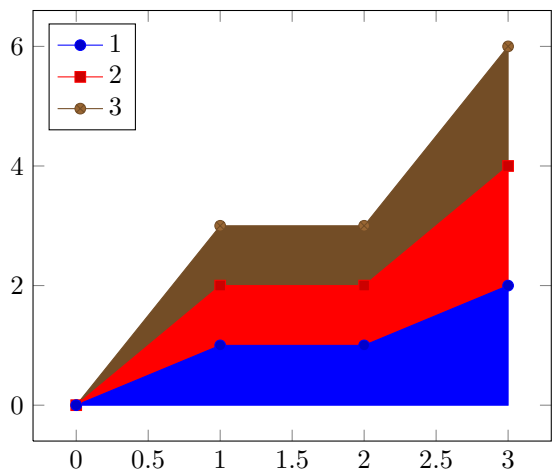
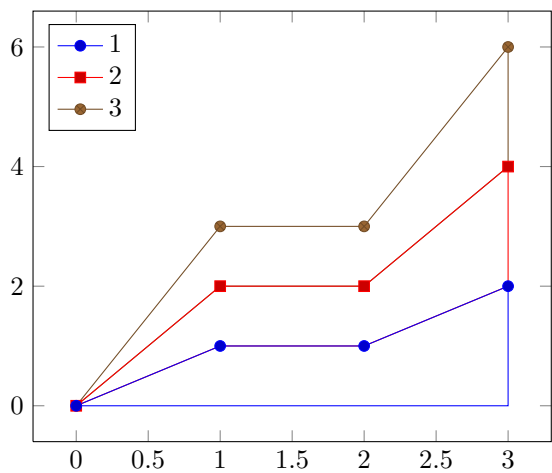
pgfplotstest.plottypes.tex

22.1 Stacked plots

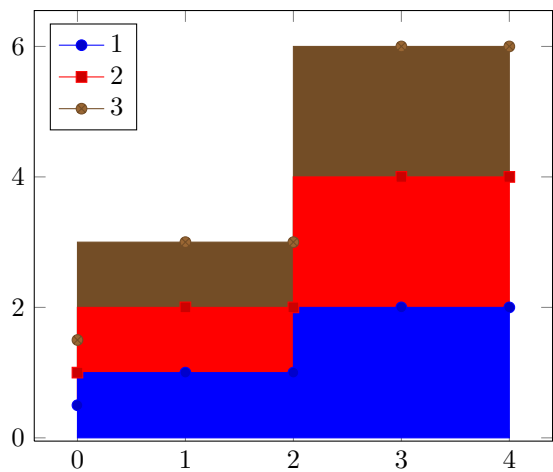
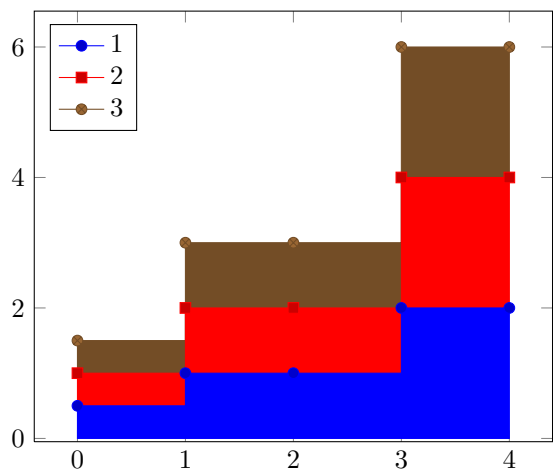
22.1.1 stack y, sharp plot



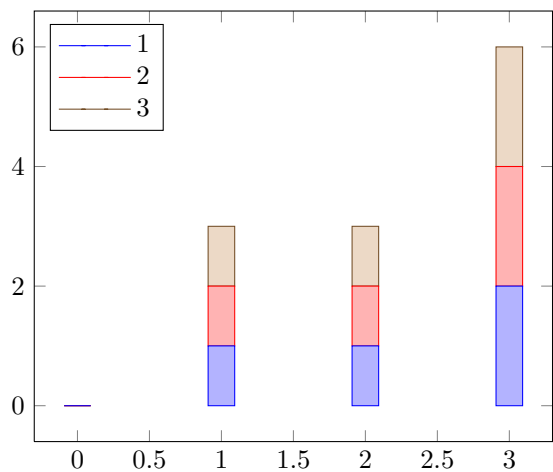
with closedcycle



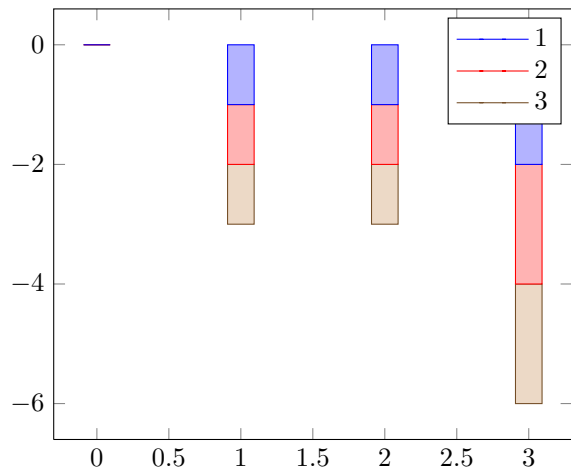
with closedcycle and const plots



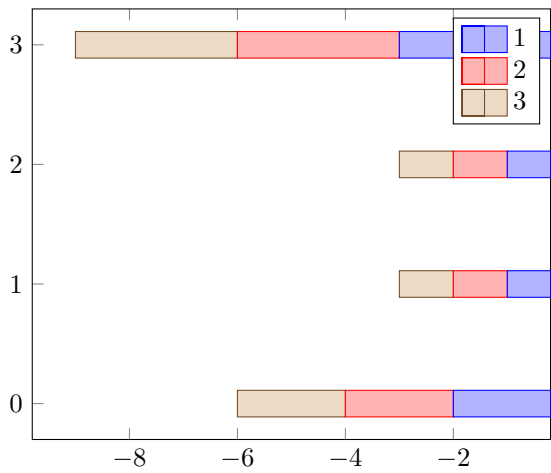
22.1.2 stack y, ybar



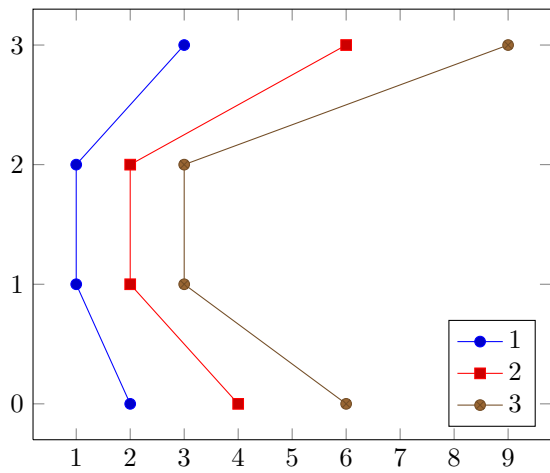
22.1.3 stack y, ybar, minus



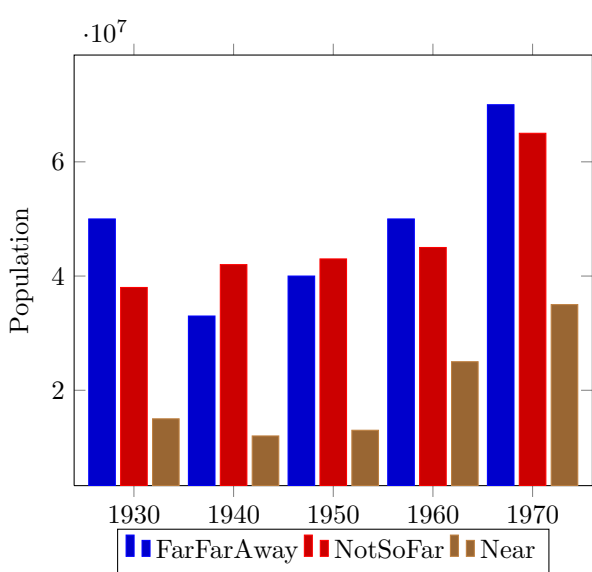
22.1.6 stack x, xbar, minus



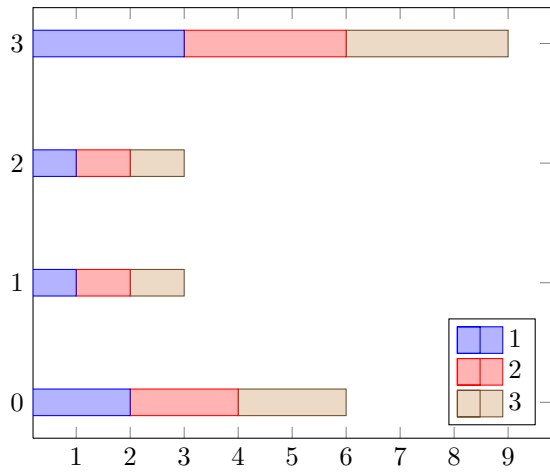
22.1.4 stack x, sharp plot [not useful]



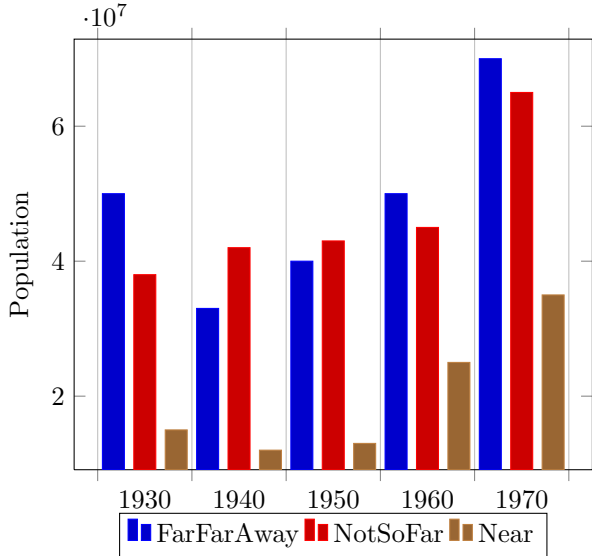
22.2 Bar diagrams

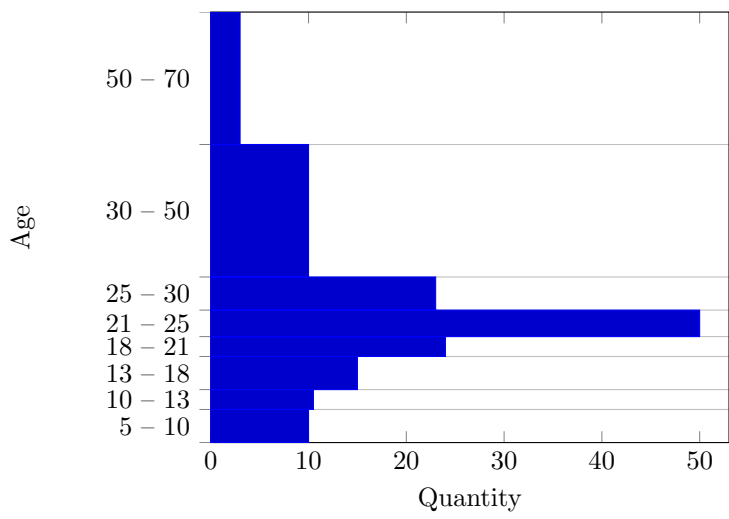


22.1.5 stack x, xbar

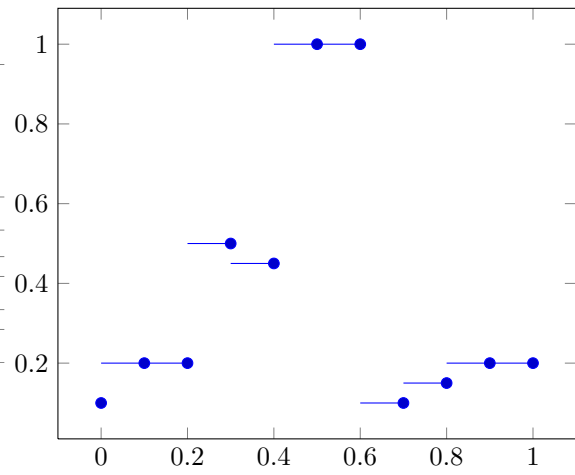


22.2.1 Interval bar handlers

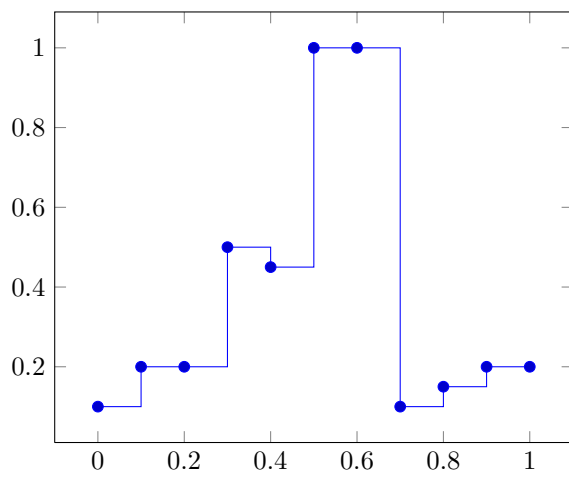




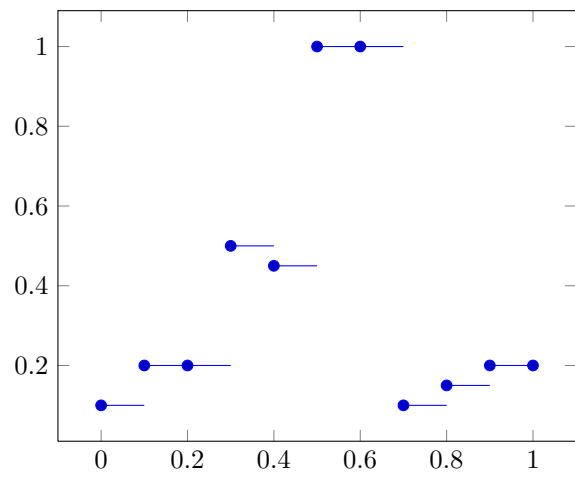
22.5 jump mark right



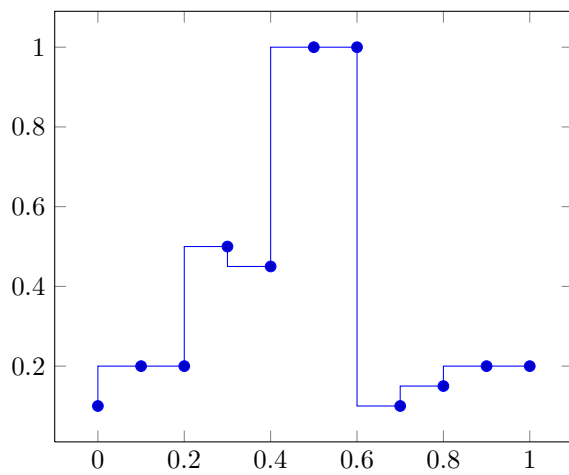
22.3 const plot



22.6 jump mark left



22.4 const plot mark right



Chapter 23

pgfplotstest.binary.tex

23.1 bytes=4, pgfplotsbinaryencode-unsigned

0→ 00000000
1→ 00000001
2→ 00000002
3→ 00000003
4→ 00000004
5→ 00000005
6→ 00000006
7→ 00000007
8→ 00000008
9→ 00000009
10→ 0000000A
11→ 0000000B
12→ 0000000C
13→ 0000000D
14→ 0000000E
15→ 0000000F
16→ 00000010
128→ 00000080
129→ 00000081
255→ 000000FF
256→ 00000100
1000→ 000003E8
65533→ 0000FFFD
65534→ 0000FFFE

23.2 bytes=2, pgfplotsbinaryencode-unsigned

0→ 0000
1→ 0001
2→ 0002
3→ 0003
4→ 0004
5→ 0005
6→ 0006

7→ 0007
8→ 0008
9→ 0009
10→ 000A
11→ 000B
12→ 000C
13→ 000D
14→ 000E
15→ 000F
16→ 0010
128→ 0080
129→ 0081
255→ 00FF
256→ 0100
1000→ 03E8
65533→ FFFD
65534→ FFFE

23.3 bytes=4, pgfplotsbinaryencode-signedmaplinearly

-2147483647→ 00000000
-16384→ 7FFFBFFF
-500→ 7FFFFE0B
-1→ 7FFFFFFE
0→ 80000000
16→ 8000000F
128→ 8000007F
129→ 80000080
255→ 800000FE
256→ 800000FF
1000→ 800003E7
65533→ 8000FFFC
65534→ 8000FFFD
2147483647→ FFFFFFFF

23.4 bytes=3, pgfplotsbinaryencode- signedmaplinearly

-2147483647 \mapsto 000000
-16384 \mapsto 7FFFBF
-500 \mapsto 7FFFFE
-1 \mapsto 800000
0 \mapsto 800000
16 \mapsto 800000
128 \mapsto 800000
129 \mapsto 800000
255 \mapsto 800000
256 \mapsto 800000
1000 \mapsto 800002
65533 \mapsto 8000FE
65534 \mapsto 8000FE
2147483647 \mapsto FFFFFE

23.5 bytes=2, pgfplotsbinaryencode- signedmaplinearly

-2147483647 \mapsto 0000
-16384 \mapsto 8000
-500 \mapsto 8000
-1 \mapsto 8000
0 \mapsto 8000
16 \mapsto 8000
128 \mapsto 8000
129 \mapsto 8000
255 \mapsto 8000
256 \mapsto 8000
1000 \mapsto 8000
65533 \mapsto 8000
65534 \mapsto 8000
2147483647 \mapsto FFFE

23.6 bytes=4, pgfplotsbinaryen- codedimenmaplinearly

-16383.99999pt \mapsto 00000001
-1pt \mapsto 7FFDFFFF
0pt \mapsto 80000000
1pt \mapsto 8001FFFF
16383.99999pt \mapsto FFFFFFFD

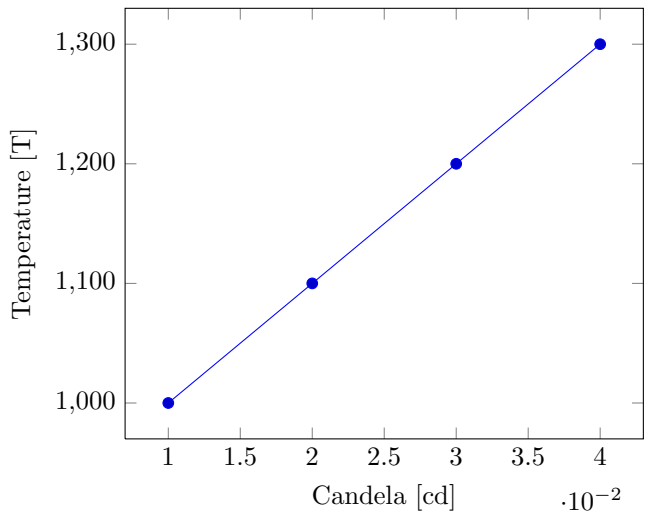
23.7 bytes=3, pgfplotsbinaryen- codedimenmaplinearly

-16383.99999pt \mapsto 000000
-1pt \mapsto 7FFDFF
0pt \mapsto 800000
1pt \mapsto 8001FF
16383.99999pt \mapsto FFFFFE

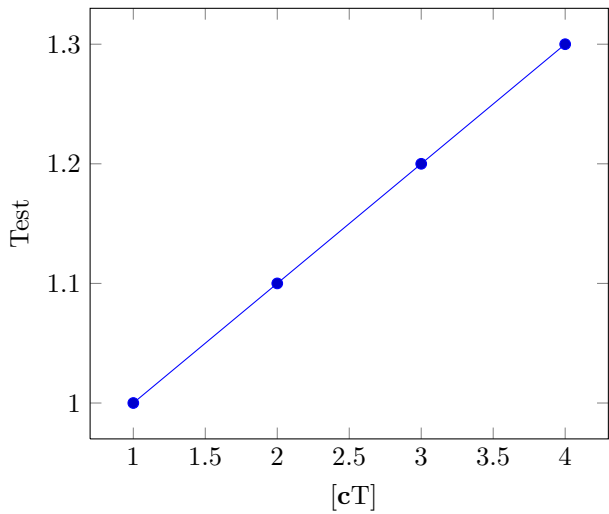
23.8 bytes=2, pgfplotsbinaryen- codedimenmaplinearly

-16383.99999pt \mapsto 0000
-1pt \mapsto 7FFE
0pt \mapsto 8000
1pt \mapsto 8000
16383.99999pt \mapsto FFFE

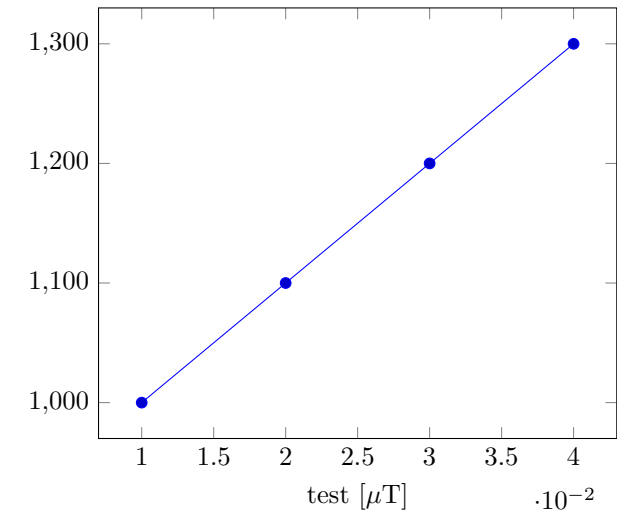
23.9 Library: Units in labels



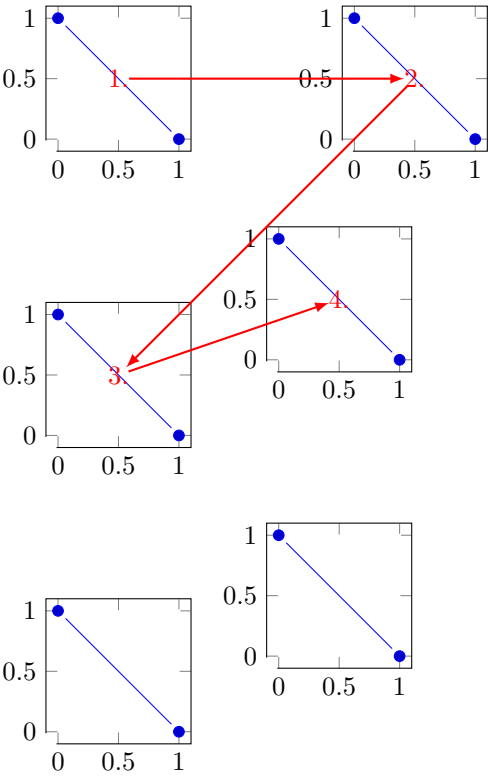
With scaled



With prefix no scale



23.10 Library: Groupplots



Chapter 24

pgfplotstest.utils

24.1 Unscoped pgfplotsforeachentry- inCSV Loops

Single loop iter #1
Single loop iter #2
Single loop iter #3
Single loop iter #4
Single loop iter #5
Single loop iter #6
Nested loop iter #1,1
Nested loop iter #1,2
Nested loop iter #1,3
Nested loop iter #1,4
Nested loop iter #1,5
Nested loop iter #1,6
(End of outer #1)
Nested loop iter #2,1
Nested loop iter #2,2
Nested loop iter #2,3
Nested loop iter #2,4
Nested loop iter #2,5
Nested loop iter #2,6
(End of outer #2)
Nested loop iter #3,1
Nested loop iter #3,2
Nested loop iter #3,3
Nested loop iter #3,4
Nested loop iter #3,5
Nested loop iter #3,6
(End of outer #3)
Nested loop iter #4,1
Nested loop iter #4,2
Nested loop iter #4,3
Nested loop iter #4,4
Nested loop iter #4,5
Nested loop iter #4,6
(End of outer #4)
Nested loop iter #5,1

Nested loop iter #5,2
Nested loop iter #5,3
Nested loop iter #5,4
Nested loop iter #5,5
Nested loop iter #5,6
(End of outer #5)
Nested loop iter #6,1
Nested loop iter #6,2
Nested loop iter #6,3
Nested loop iter #6,4
Nested loop iter #6,5
Nested loop iter #6,6
(End of outer #6)

24.2 pgfplotsforeachungrouped

24.2.1 without FPU

1,2,...,4

1
2
3
4
(1, 1)
(1, 2)
(1, 3)
(1, 4)
(2, 1)
(2, 2)
(2, 3)
(2, 4)
(3, 1)
(3, 2)
(3, 3)
(3, 4)
(4, 1)
(4, 2)
(4, 3)

(4, 4)	(-1, -3)
	(-1, -4)
1,...,4	(-2, 1)
1	(-2, 0)
2	(-2, -1)
3	(-2, -2)
4	(-2, -3)
(1, 1)	(-2, -4)
(1, 2)	(-3, 1)
(1, 3)	(-3, 0)
(1, 4)	(-3, -1)
(2, 1)	(-3, -2)
(2, 2)	(-3, -3)
(2, 3)	(-3, -4)
(2, 4)	(-4, 1)
(3, 1)	(-4, 0)
(3, 2)	(-4, -1)
(3, 3)	(-4, -2)
(3, 4)	(-4, -3)
(4, 1)	(-4, -4)
(4, 2)	
(4, 3)	
(4, 4)	
	24.2.2 with FPU
1,0,...,-4	1,2,...,4
1	1Y1.0e0]
0	1Y2.0e0]
-1	1Y3.0e0]
-2	1Y4.0e0]
-3	(1Y1.0e0], 1Y1.0e0])
-4	(1Y1.0e0], 1Y2.0e0])
(1, 1)	(1Y1.0e0], 1Y3.0e0])
(1, 0)	(1Y1.0e0], 1Y4.0e0])
(1, -1)	(1Y2.0e0], 1Y1.0e0])
(1, -2)	(1Y2.0e0], 1Y2.0e0])
(1, -3)	(1Y2.0e0], 1Y3.0e0])
(1, -4)	(1Y2.0e0], 1Y4.0e0])
(0, 1)	(1Y3.0e0], 1Y1.0e0])
(0, 0)	(1Y3.0e0], 1Y2.0e0])
(0, -1)	(1Y3.0e0], 1Y3.0e0])
(0, -2)	(1Y3.0e0], 1Y4.0e0])
(0, -3)	(1Y4.0e0], 1Y1.0e0])
(0, -4)	(1Y4.0e0], 1Y2.0e0])
(-1, 1)	(1Y4.0e0], 1Y3.0e0])
(-1, 0)	(1Y4.0e0], 1Y4.0e0])
(-1, -1)	
(-1, -2)	
	1,...,4
	1

2	(2Y2.0e0], 2Y1.0e0])
3	(2Y2.0e0], 2Y2.0e0])
4	(2Y2.0e0], 2Y3.0e0])
(1, 1)	(2Y2.0e0], 2Y4.0e0])
(1, 2)	(2Y3.0e0], 1Y1.0e0])
(1, 3)	(2Y3.0e0], 0Y0.0e-2])
(1, 4)	(2Y3.0e0], 2Y1.0e0])
(2, 1)	(2Y3.0e0], 2Y2.0e0])
(2, 2)	(2Y3.0e0], 2Y3.0e0])
(2, 3)	(2Y3.0e0], 2Y4.0e0])
(2, 4)	(2Y4.0e0], 1Y1.0e0])
(3, 1)	(2Y4.0e0], 0Y0.0e-2])
(3, 2)	(2Y4.0e0], 2Y1.0e0])
(3, 3)	(2Y4.0e0], 2Y2.0e0])
(3, 4)	(2Y4.0e0], 2Y3.0e0])
(4, 1)	(2Y4.0e0], 2Y4.0e0])
(4, 2)	
(4, 3)	
(4, 4)	

1,0,...,-4

1Y1.0e0]	
0Y0.0e-2]	
2Y1.0e0]	
2Y2.0e0]	
2Y3.0e0]	
2Y4.0e0]	
(1Y1.0e0], 1Y1.0e0])	
(1Y1.0e0], 0Y0.0e-2])	
(1Y1.0e0], 2Y1.0e0])	
(1Y1.0e0], 2Y2.0e0])	
(1Y1.0e0], 2Y3.0e0])	
(1Y1.0e0], 2Y4.0e0])	
(0Y0.0e-2], 1Y1.0e0])	
(0Y0.0e-2], 0Y0.0e-2])	
(0Y0.0e-2], 2Y1.0e0])	
(0Y0.0e-2], 2Y2.0e0])	
(0Y0.0e-2], 2Y3.0e0])	
(0Y0.0e-2], 2Y4.0e0])	
(2Y1.0e0], 1Y1.0e0])	
(2Y1.0e0], 0Y0.0e-2])	
(2Y1.0e0], 2Y1.0e0])	
(2Y1.0e0], 2Y2.0e0])	
(2Y1.0e0], 2Y3.0e0])	
(2Y1.0e0], 2Y4.0e0])	
(2Y2.0e0], 1Y1.0e0])	
(2Y2.0e0], 0Y0.0e-2])	