

The numodel-plot package*

Paul Zuurbier
mail@paulzuurbier.nl

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Abstract

A PGFPlots engine that auto-sizes plots to a whole number of tick intervals, supports configurable axis-label formats (IEEE-style by default; ISO 80000-1 also supported), and automatically selects label placement for 1-, 2-, and 4-quadrant graphs. Part of the numodel package suite, but can be loaded standalone as an independent PGFPlots styling layer.

Contents

1	Introduction	1
2	Usage	2
3	Configuration	2
3.1	Keys	2
3.2	PGFPlots styles	3
4	Public API	3
5	Requirements	3
6	Implementation	3

1 Introduction

numodel-plot fills a gap between bare PGFPlots and the heavy styling required for physics-teaching material: it sizes every axis to an integer number of centimetre ticks, lays out the axis origin according to which quadrants of the coordinate plane contain data, and renders axis labels as either `quantity (unit)` (IEEE, the default) or one of four alternative conventions selectable at package level. It was extracted from a Dutch high-school physics test set where uniform plot appearance across hundreds of graphs is more valuable than per-graph tweaking, and hence adopts an opinionated default style. Users who need one-off deviations are expected to drop to plain PGFPlots with the variable macros `\xmin`, `\xmax`, ... exposed by this package.

*This document corresponds to numodel-plot v0.2.0, dated May 16, 2026.

2 Usage

Minimum working example:

```
\usepackage{numodel-plot}
...
\def\xmin{0}    \def\xmax{10}
\def\ymin{0}    \def\ymax{5}
\def\xlabelqty{t} \def\xlabelunit{s}
\def\ylabelqty{v} \def\ylabelunit{m\per s}
\drawplot{\addplot[domain=\xmin:\xmax]{0.5*x};}
```

The user sets the data range (`\xmin...``\ymax`) and optionally a quantity symbol plus `siunitx` unit for each axis. `\drawplot` internally calls `\calcplotdims` to round the range to a clean tick lattice and compute the axis size in centimetres, then renders a full `tikzpicture+axis` environment whose body is the argument (one or more `\addplot` lines).

Labels are built automatically from `\xlabelqty`+`\xlabelunit` (and likewise for the y -axis). If the data magnitude exceeds 10^4 or is below 10^{-2} , a factor 10^n is injected into the label and PGFPlots' own `scaled ticks` are configured so that tick numbers remain small.

Users preferring full control can omit `\xlabelqty`/`\xlabelunit` and set `\xlabel`/`\ylabel` directly; the package will use them verbatim.

3 Configuration

`\numodelplotsetup` Configuration is set through a single key–value interface:

```
\numodelplotsetup{axis-label-format=ieee, grid=mm-dots}
```

3.1 Keys

axis-label-format Default `ieee`. Determines the notation emitted for axis labels built from `\xlabelqty` and `\xlabelunit`:

<code>ieee</code>	<code>v (m/s)</code>	IEEE (default)
<code>iso</code>	<code>v / (m/s)</code>	ISO 80000-1
<code>brackets</code>	<code>v [m/s]</code>	older physics convention
<code>qty-only</code>	<code>v</code>	quantity symbol only
<code>unit-only</code>	<code>m/s</code>	unit only

When scaling is applied (data exceeds 10^4 or below 10^{-2}), the factor is integrated into the label, e.g. `v (104 m/s)` for IEEE. Under `qty-only` the exponent remains in PGFPlots' scaled-tick label instead (otherwise the scale information would be lost).

grid Default `mm-dots` (black millimetre dots, matching engineering millimetre paper). Accepts `none`, or any PGFPlots style list which will be passed verbatim to the `numodel/grid` style.

xcmmax, **ycmmax** Maximum axis width and height in centimetres (defaults 12 and 10).

3.2 PGFPlots styles

The package defines three PGFPlots styles applied by `\drawplot`: `numodel/grid`, `numodel/ticks`, `numodel/axis`. These can be overridden wholesale through `\pgfplotsset{numodel/axis/.style={...}}` from the calling preamble, giving projects a single choke point for house-style customisation.

4 Public API

<code>\drawplot</code>	Renders a <code>tikzpicture</code> containing an axis whose body is the single mandatory argument. Typically a block of <code>\addplot</code> and <code>\addlegendentry</code> lines. Calls <code>\calcplothdims</code> internally, so the user does not need to invoke it separately.
<code>\calcplothdims</code>	Reads <code>\xmin</code> , <code>\xmax</code> , <code>\ymin</code> , <code>\ymax</code> , and (if set) <code>\xlabelqty</code> / <code>\xlabelunit</code> / <code>\ylabelqty</code> / <code>\ylabelunit</code> . Writes <code>\xcm</code> , <code>\ycm</code> , <code>\xtickdistance</code> , <code>\ytickdistance</code> , <code>\xlabel</code> , <code>\ylabel</code> , and may rewrite <code>\xmin... \ymax</code> to align with the tick lattice (floor/ceil to the nearest tick). It also appends axis-positioning styles to <code>numodel/axis</code> based on which quadrants the data occupies. <code>\drawplot</code> invokes it automatically; expose for advanced cases where dimensions are needed before rendering (overlay TikZ, custom axis environment).
<code>\xlabelqty</code>	Input hooks for automatic label construction. <code>\xlabelqty</code> is the mathematical quantity symbol (e.g. <code>v</code> , <code>F</code> , <code>E</code>); the corresponding <code>\xlabelunit</code> is a bare <code>siunitx</code> unit macro sequence (e.g. <code>\m\per\s</code> , <code>\J</code> , <code>\N\m</code>) <i>without</i> a surrounding <code>\si{}</code> or <code>\qty{}</code> wrapper.
<code>\xlabelunit</code>	
<code>\ylabelqty</code>	
<code>\ylabelunit</code>	
<code>\xcmmax</code>	Maximum axis dimensions in centimetres. Can be set directly through <code>\def</code>
<code>\ycmmax</code>	for backwards compatibility, or via <code>\numodelplotsetup</code> .
<code>\qtyPlain</code>	Like <code>siunitx</code> 's <code>\qty</code> but prints no numeric mantissa when the final output after prefix extraction has mantissa 1 and exponent 0. Used internally to inject scale factors into axis labels; exposed because the same need recurs in other scaled-axis contexts.
<code>\pzuIfUnitNonEngTF</code>	Boolean conditional testing whether a unit macro sequence contains a non-engineering SI prefix (<code>\centi</code> , <code>\deci</code> , <code>\deca</code> , <code>\hecto</code> , plus the <code>siunitx</code> short forms <code>\cm</code> , <code>\dm</code> , <code>\hPa</code> , ...). Used internally to suppress scaling on units where the user has already encoded the order of magnitude; exposed for completeness.

5 Requirements

`numodel-plot` requires `expl3`, `xparse`, `l3keys2e`, `siunitx` (mandatory, for quantities in labels), and `pgfplots` (with the `fillbetween` library). LuaLaTeX is not required at the plot layer (it is required by the sibling `numodel` package).

6 Implementation

All internal helper macros use the `\nmp@...` prefix (standard LaTeX internal convention). Because the package may be loaded through `\input` as well as `\usepackage`, an explicit `\makeatletter` wraps the body so that `@` is a letter regardless of caller.

```

1 \NeedsTeXFormat{LaTeX2e}
2 \ProvidesPackage{numodel-plot}[2026/05/16 v0.2.0 Auto-sizing PGFPlots engine]
3

```

```

4 \makeatletter
5
6 \RequirePackage{expl3}
7 \RequirePackage{xparse}
8 \RequirePackage{l3keys2e}
9 \RequirePackage{siunitx}
10 \RequirePackage{pgfplots}
11 \usepgfplotslibrary{fillbetween}
12
13 \pgfplotsset{
14   compat=1.18,
15   numodel/grid/.style={
16     grid=both,
17     grid style={
18       line width=0.5pt,
19       draw=black,
20       line cap=round,
21       dash pattern=on 0pt off 1mm
22     },
23     major grid style={
24       line width=0.5pt,
25       draw=black,
26       line cap=round,
27       dash pattern=on 0pt off 1mm}
28   },
29   numodel/ticks/.style={
30     tick style={black}
31   },
32   numodel/axis/.style={
33     xticklabel style={/pgf/number format/.cd, fixed, precision=6, fixed zerofill=false, use c
34     yticklabel style={/pgf/number format/.cd, fixed, precision=6, fixed zerofill=false, use c
35     axis lines=left,
36     xlabel near ticks,
37     ylabel near ticks,
38     ylabel style={rotate=-90},
39     axis line style={-}
40   }
41 }
42
43 \ExplSyntaxOn
44
45 \tl_new:N \g__numodelplot_axislabel_tl
46 \tl_gset:Nn \g__numodelplot_axislabel_tl {ieee}
47
48 \providecommand{\xcmmax}{12}
49 \providecommand{\ycmmax}{10}
50
51 \keys_define:nn { numodel-plot }
52 {
53   axis-label-format .choice:,
54   axis-label-format / iso .code:n =
55     \tl_gset:Nn \g__numodelplot_axislabel_tl {iso},
56   axis-label-format / ieee .code:n =
57     \tl_gset:Nn \g__numodelplot_axislabel_tl {ieee},

```

```

58 axis-label-format / brackets .code:n =
59   \tl_gset:Nn \g__numodelplot_axislabel_tl {brackets},
60 axis-label-format / qty-only .code:n =
61   \tl_gset:Nn \g__numodelplot_axislabel_tl {qty-only},
62 axis-label-format / unit-only .code:n =
63   \tl_gset:Nn \g__numodelplot_axislabel_tl {unit-only},
64
65 grid .choice:,
66 grid / mm-dots .code:n =
67   \pgfplotsset{ numodel/grid/.style={
68     grid=both,
69     grid~style={line-width=0.5pt, draw=black, line~cap=round,
70       dash~pattern=on~0pt~off~1mm},
71     major~grid~style={line-width=0.5pt, draw=black, line~cap=round,
72       dash~pattern=on~0pt~off~1mm}
73   } },
74 grid / none .code:n =
75   \pgfplotsset{ numodel/grid/.style={grid=none} },
76 grid .unknown .code:n =
77   \pgfplotsset{ numodel/grid/.style={#1} },
78
79 xcmmax .code:n = \def\xcmmax{#1},
80 ycmmax .code:n = \def\ycmmax{#1},
81 }
82
83 \NewDocumentCommand{\numodelplotsetup}{m}
84 { \keys_set:nn { numodel-plot } {#1} }
85
86 \ExplSyntaxOff
87
88 \ExplSyntaxOn
89 \bool_new:N \g__pzu_suppress_qp_bool
90 \cs_new_eq:NN \__pzu_orig_int_output:nnn \__siunitx_number_output_integer:nnn
91 \cs_new_eq:NN \__pzu_orig_qty_print_unit:n \__siunitx_quantity_print_unit:n
92 \NewDocumentCommand{\qtyPlain}{0}{ m m}{%
93   \group_begin:
94     \bool_gset_false:N \g__pzu_suppress_qp_bool
95     \cs_set:Npn \__siunitx_number_output_integer:nnn ##1##2##3 {
96       \bool_lazy_all:nTF
97         {
98           { \str_if_eq_p:nn { ##1 . ##2 } { 1. } }
99           { \str_if_eq_p:nn {##3} { 0 } }
100           { ! \l__siunitx_number_zero_exponent_bool }
101           { ! \l__siunitx_number_unity_mantissa_bool }
102         }
103         { \bool_gset_true:N \g__pzu_suppress_qp_bool }
104         { \__pzu_orig_int_output:nnn {##1} {##2} {##3} }
105     }
106     \cs_set_protected:Npn \__siunitx_quantity_print_unit:n ##1 {
107       \bool_if:NTF \l__siunitx_quantity_break_bool
108         { \penalty \binoppenalty }
109         { \nobreak }
110       \bool_if:NF \g__pzu_suppress_qp_bool
111         { \tl_use:N \l__siunitx_quantity_product_tl }

```

```

112     \siunitx_print_unit:n {##1}
113   }
114   \qty[#1]{#2}{#3}%
115 \group_end:
116 }
117 \ExplSyntaxOff
118
119 \ExplSyntaxOn
120 \bool_new:N \l__pzu_noneng_bool
121 \tl_const:Nn \c__pzu_noneng_tokens_tl {
122   \centi \deci \deca \hecto
123   \cm \cg \cL
124   \dm \dg \dL
125   \dam \dag \daL
126   \hm \hg \hL \hPa
127 }
128 \prg_new_protected_conditional:Npnn \__pzu_unit_has_noneng:n #1 { TF } {
129   \bool_set_false:N \l__pzu_noneng_bool
130   \tl_map_inline:Nn \c__pzu_noneng_tokens_tl {
131     \tl_if_in:nnT {#1} {##1}
132     { \bool_set_true:N \l__pzu_noneng_bool \tl_map_break: }
133   }
134   \bool_if:NTF \l__pzu_noneng_bool
135   { \prg_return_true: }
136   { \prg_return_false: }
137 }
138 \prg_generate_conditional_variant:Nnn \__pzu_unit_has_noneng:n { o } { TF }
139 \NewDocumentCommand{\pzuIfUnitNonEngTF}{m m m}{%
140   \__pzu_unit_has_noneng:oTF {#1} {#2} {#3}%
141 }
142 \ExplSyntaxOff
143
144 \ExplSyntaxOn
145
146 \cs_new_protected:Npn \__numodelplot_xlabel_emit_unscaled:
147 {
148   \str_case:Vn \g__numodelplot_axislabel_tl
149   {
150     {iso}
151     { \def \xlabel { $\nmp@savexlabelqty \, /\, ( \si{\nmp@savexlabelunit} )$ } }
152     {ieee}
153     { \def \xlabel { $\nmp@savexlabelqty \, ( \si{\nmp@savexlabelunit} )$ } }
154     {brackets}
155     { \def \xlabel { $\nmp@savexlabelqty \, [ \si{\nmp@savexlabelunit} ]$ } }
156     {qty-only}
157     { \def \xlabel { $\nmp@savexlabelqty$ } }
158     {unit-only}
159     { \def \xlabel { $\si{\nmp@savexlabelunit}$ } }
160   }
161 }
162
163 \cs_new_protected:Npn \__numodelplot_xlabel_emit_scaled:
164 {
165   \str_case:Vn \g__numodelplot_axislabel_tl

```

```

166 {
167   {iso}
168   {
169     \edef\xlabel{\noexpand$\noexpand\nmp@savexlabelqty
170       \noexpand\,/ \noexpand\, (\noexpand\qtyPlain
171       [evaluate-expression=false, round-mode=none,
172       prefix-mode=extract-exponent,
173       extract-mass-in-kilograms=true,
174       print-zero-exponent=false,
175       print-unity-mantissa=false]%
176       {1e\nmp@xlabexpuse}{\noexpand\nmp@savexlabelunit})\noexpand$}%
177   }
178   {ieee}
179   {
180     \edef\xlabel{\noexpand$\noexpand\nmp@savexlabelqty
181       \noexpand\, (\noexpand\qtyPlain
182       [evaluate-expression=false, round-mode=none,
183       prefix-mode=extract-exponent,
184       extract-mass-in-kilograms=true,
185       print-zero-exponent=false,
186       print-unity-mantissa=false]%
187       {1e\nmp@xlabexpuse}{\noexpand\nmp@savexlabelunit})\noexpand$}%
188   }
189   {brackets}
190   {
191     \edef\xlabel{\noexpand$\noexpand\nmp@savexlabelqty
192       \noexpand\, [\noexpand\qtyPlain
193       [evaluate-expression=false, round-mode=none,
194       prefix-mode=extract-exponent,
195       extract-mass-in-kilograms=true,
196       print-zero-exponent=false,
197       print-unity-mantissa=false]%
198       {1e\nmp@xlabexpuse}{\noexpand\nmp@savexlabelunit}]\noexpand$}%
199   }
200   {qty-only}
201   { \def \xlabel { $\nmp@savexlabelqty$ } }
202   {unit-only}
203   {
204     \edef\xlabel{\noexpand$\noexpand\qtyPlain
205       [evaluate-expression=false, round-mode=none,
206       prefix-mode=extract-exponent,
207       extract-mass-in-kilograms=true,
208       print-zero-exponent=false,
209       print-unity-mantissa=false]%
210       {1e\nmp@xlabexpuse}{\noexpand\nmp@savexlabelunit}\noexpand$}%
211   }
212 }
213 }
214
215 \cs_new_protected:Npn \__numodelplot_ylabel_emit_unscaled:
216 {
217   \str_case:Vn \g__numodelplot_axislabel_tl
218   {
219     {iso}

```

```

220     { \def \ylabel { $\nmp@savedylabelqty \, /\, ( \si{\nmp@savedylabelunit} )$ } }
221 {ieee}
222     { \def \ylabel { $\nmp@savedylabelqty \, ( \si{\nmp@savedylabelunit} )$ } }
223 {brackets}
224     { \def \ylabel { $\nmp@savedylabelqty \, [ \si{\nmp@savedylabelunit} ]$ } }
225 {qty-only}
226     { \def \ylabel { $\nmp@savedylabelqty$ } }
227 {unit-only}
228     { \def \ylabel { $\si{\nmp@savedylabelunit}$ } }
229 }
230 }
231
232 \cs_new_protected:Npn \__numodelplot_ylabel_emit_scaled:
233 {
234     \str_case:Vn \g__numodelplot_axislabel_tl
235     {
236         {iso}
237         {
238             \edef\ylabel{\noexpand$\noexpand\nmp@savedylabelqty
239             \noexpand\,/\noexpand\,(\noexpand\qtyPlain
240             [evaluate-expression=false, round-mode=none,
241             prefix-mode=extract-exponent,
242             extract-mass-in-kilograms=true,
243             print-zero-exponent=false,
244             print-unity-mantissa=false]%
245             {1e\nmp@ylabelexpuse}{\noexpand\nmp@savedylabelunit}}\noexpand$}%
246         }
247     {ieee}
248     {
249         \edef\ylabel{\noexpand$\noexpand\nmp@savedylabelqty
250         \noexpand\,(\noexpand\qtyPlain
251         [evaluate-expression=false, round-mode=none,
252         prefix-mode=extract-exponent,
253         extract-mass-in-kilograms=true,
254         print-zero-exponent=false,
255         print-unity-mantissa=false]%
256         {1e\nmp@ylabelexpuse}{\noexpand\nmp@savedylabelunit}}\noexpand$}%
257     }
258 {brackets}
259     {
260         \edef\ylabel{\noexpand$\noexpand\nmp@savedylabelqty
261         \noexpand\,[\noexpand\qtyPlain
262         [evaluate-expression=false, round-mode=none,
263         prefix-mode=extract-exponent,
264         extract-mass-in-kilograms=true,
265         print-zero-exponent=false,
266         print-unity-mantissa=false]%
267         {1e\nmp@ylabelexpuse}{\noexpand\nmp@savedylabelunit}}\noexpand$}%
268     }
269 {qty-only}
270     { \def \ylabel { $\nmp@savedylabelqty$ } }
271 {unit-only}
272     {
273         \edef\ylabel{\noexpand$\noexpand\qtyPlain

```



```

274         [evaluate-expression=false, round-mode=none,
275         prefix-mode=extract-exponent,
276         extract-mass-in-kilograms=true,
277         print-zero-exponent=false,
278         print-unity-mantissa=false]%
279         {1e\nmp@ylabelexpuse}{\noexpand\nmp@savedylabelunit}\noexpand$}%
280     }
281 }
282 }
283
284 \ExplSyntaxOff
285
286 \newcommand{\pznmpAppendXScaleTicks}[1]{%
287   \pgfplotsset{numodel/axis/.append style={scaled x ticks=base 10:#1}}%
288 }
289 \newcommand{\pznmpAppendYScaleTicks}[1]{%
290   \pgfplotsset{numodel/axis/.append style={scaled y ticks=base 10:#1}}%
291 }
292 \newcommand{\pznmpSuppressXScaleLabel}{%
293   \pgfplotsset{numodel/axis/.append style={every x tick scale label/.style={opacity=0, inner
294 }
295 \newcommand{\pznmpSuppressYScaleLabel}{%
296   \pgfplotsset{numodel/axis/.append style={every y tick scale label/.style={opacity=0, inner
297 }
298
299 \ExplSyntaxOn
300
301 \cs_new_protected:Npn \__numodelplot_suppress_xscale_label:
302 {
303   \str_if_eq:VnF \g__numodelplot_axislabel_tl {qty-only}
304   { \pznmpSuppressXScaleLabel }
305 }
306 \cs_new_protected:Npn \__numodelplot_suppress_yscale_label:
307 {
308   \str_if_eq:VnF \g__numodelplot_axislabel_tl {qty-only}
309   { \pznmpSuppressYScaleLabel }
310 }
311
312 \ExplSyntaxOff
313
314 \ExplSyntaxOn
315 \NewDocumentCommand{\xlabelbuild}{-}{
316   \let\nmp@savexlabelqty\xlabelqty
317   \let\nmp@savexlabelunit\xlabelunit
318   \pzuIfUnitNonEngTF{\xlabelunit}{
319     \__numodelplot_xlabel_emit_unscaled:
320     \def\nmp@xlabelexp{0}
321   }{
322     \edef\nmp@xmag{\fpeval{max(abs(\xmin),abs(\xmax))}}
323     \edef\nmp@xlabelexp{\fpeval{
324       \nmp@xmag > 0 ? 3*floor(ln(\nmp@xmag)/ln(10)/3) : 0
325     }}
326     \edef\nmp@xlabelexpuse{\nmp@xlabelexp}
327     \__numodelplot_xlabel_emit_scaled:

```

```

328 \ifnum\nmp@xlabelexp=0\relax\else
329 \edef\nmp@xlabelexpneg{\fpeval{-\nmp@xlabelexp}}
330 \pznmpAppendXScaleTicks{\nmp@xlabelexpneg}
331 \__numodelplot_suppress_xscale_label:
332 \fi
333 }
334 \global\let\xlabelqty\undefined
335 \global\let\xlabelunit\undefined
336 }
337
338 \NewDocumentCommand{\ylabelbuild}{*}{
339 \let\nmp@savedylabelqty\ylabelqty
340 \let\nmp@savedylabelunit\ylabelunit
341 \pzuIfUnitNonEngTF{\ylabelunit}{
342 \__numodelplot_ylabel_emit_unscaled:
343 \def\nmp@ylabelexp{0}
344 }{
345 \edef\nmp@ymag{\fpeval{max(abs(\ymin),abs(\ymax))}}
346 \edef\nmp@ylabelexp{\fpeval{
347 \nmp@ymag > 0 ? 3*floor(ln(\nmp@ymag)/ln(10)/3) : 0
348 }}
349 \edef\nmp@ylabelexpuse{\nmp@ylabelexp}
350 \__numodelplot_ylabel_emit_scaled:
351 \ifnum\nmp@ylabelexp=0\relax\else
352 \edef\nmp@ylabelexpneg{\fpeval{-\nmp@ylabelexp}}
353 \pznmpAppendYScaleTicks{\nmp@ylabelexpneg}
354 \__numodelplot_suppress_yscale_label:
355 \fi
356 }
357 \global\let\ylabelqty\undefined
358 \global\let\ylabelunit\undefined
359 }
360 \ExplSyntaxOff
361
362 \newcommand{\calcplotdims}{
363 \edef\nmp@xlog{\fpeval{floor(ln(\xmax-\xmin)/ln(10))}}
364 \edef\nmp@ylog{\fpeval{floor(ln(\ymax-\ymin)/ln(10))}}
365
366 \edef\nmp@xS{\fpeval{(\xmax-\xmin) / (10^\nmp@xlog)}}
367 \edef\nmp@yS{\fpeval{(\ymax-\ymin) / (10^\nmp@ylog)}}
368
369 \edef\xcm{\fpeval{
370 \nmp@xS <= \xcmmmax/10 ? 10 * \nmp@xS :
371 \nmp@xS <= \xcmmmax/5 ? 5 * \nmp@xS :
372 \nmp@xS <= \xcmmmax/4 ? 4 * \nmp@xS :
373 \nmp@xS <= \xcmmmax/2 ? 2 * \nmp@xS :
374 \nmp@xS <= \xcmmmax ? \nmp@xS :
375 \nmp@xS / 2
376 }}
377
378 \edef\ycm{\fpeval{
379 \nmp@yS <= \ycmmax/10 ? 10 * \nmp@yS :
380 \nmp@yS <= \ycmmax/5 ? 5 * \nmp@yS :
381 \nmp@yS <= \ycmmax/4 ? 4 * \nmp@yS :

```

```

382 \nmp@yS <= \ycmmax/2 ? 2 * \nmp@yS :
383 \nmp@yS <= \ycmmax ? \nmp@yS :
384 \nmp@yS / 2
385 }}
386
387 \edef\nmp@xtickdiv{\fpeval{\nmp@xS / \xcm}}
388 \edef\nmp@ytickdiv{\fpeval{\nmp@yS / \ycm}}
389
390 \edef\xtickdistance{\fpeval{\nmp@xtickdiv * 10^\nmp@xlog}}
391 \edef\ytickdistance{\fpeval{\nmp@ytickdiv * 10^\nmp@ylog}}
392
393 \edef\xmax{\fpeval{ceil(\xmax / \xtickdistance) * \xtickdistance}}
394 \edef\ymax{\fpeval{ceil(\ymax / \ytickdistance) * \ytickdistance}}
395 \edef\xmin{\fpeval{floor(\xmin / \xtickdistance) * \xtickdistance}}
396 \edef\ymin{\fpeval{floor(\ymin / \ytickdistance) * \ytickdistance}}
397 \edef\xcm{\fpeval{(\xmax - \xmin) / \xtickdistance}}
398 \edef\ycm{\fpeval{(\ymax - \ymin) / \ytickdistance}}
399
400 \edef\nmp@yStraddles{\fpeval{(\ymin<0 && \ymax>0) ? 1 : 0}}
401 \edef\nmp@yAllNonPos{\fpeval{\ymax<=0 ? 1 : 0}}
402 \edef\nmp@xStraddles{\fpeval{(\xmin<0 && \xmax>0) ? 1 : 0}}
403 \edef\nmp@xAllNonPos{\fpeval{\xmax<=0 ? 1 : 0}}
404
405 \ifnum\nmp@yStraddles=1
406 \pgfplotsset{numodel/axis/.append style={axis x line*=middle}}
407 \else
408 \ifnum\nmp@yAllNonPos=1
409 \pgfplotsset{numodel/axis/.append style={axis x line*=top}}
410 \fi
411 \fi
412
413 \ifnum\nmp@xStraddles=1
414 \pgfplotsset{numodel/axis/.append style={axis y line*=middle}}
415 \else
416 \ifnum\nmp@xAllNonPos=1
417 \pgfplotsset{numodel/axis/.append style={axis y line*=right}}
418 \fi
419 \fi
420
421 \edef\nmp@axisMoved{\fpeval{(\nmp@yStraddles || \nmp@yAllNonPos || \nmp@xStraddles || \nmp@xAllNonPos)}
422 \ifnum\nmp@axisMoved=1
423 \pgfplotsset{numodel/axis/.append style={
424 every x tick scale label/.style={at={(\xticklabel cs:1.05)}, anchor=south west},
425 every y tick scale label/.style={at={(\yticklabel cs:1.05)}, anchor=south east}
426 }}
427 \fi
428
429 \edef\nmp@fourQuad{\fpeval{(\nmp@xStraddles && \nmp@yStraddles) ? 1 : 0}}
430 \ifnum\nmp@fourQuad=1
431 \pgfplotsset{numodel/axis/.append style={
432 xlabel style={at={(\xticklabel cs:1.05)}, anchor=west},
433 ylabel style={at={(\yticklabel cs:1.05)}, anchor=south, rotate=0}
434 }}
435 \fi

```

```

436
437 \edef\nmp@qIandII{\fpeval{(\nmp@xStraddles && \ymin>=0) ? 1 : 0}}
438 \ifnum\nmp@qIandII=1
439 \pgfplotsset{numodel/axis/.append style={
440   ylabel style={at={(\yticklabel cs:1.05)}, anchor=south, rotate=0}
441 }}
442 \fi
443
444 \edef\nmp@qIIandIII{\fpeval{(\nmp@yStraddles && \nmp@xAllNonPos) ? 1 : 0}}
445 \ifnum\nmp@qIIandIII=1
446 \pgfplotsset{numodel/axis/.append style={
447   xlabel style={at={(\xticklabel cs:-0.05)}, anchor=east}
448 }}
449 \fi
450
451 \edef\nmp@qIIIandIV{\fpeval{(\nmp@xStraddles && \nmp@yAllNonPos) ? 1 : 0}}
452 \ifnum\nmp@qIIIandIV=1
453 \pgfplotsset{numodel/axis/.append style={
454   ylabel style={at={(\yticklabel cs:-0.05)}, anchor=north, rotate=0}
455 }}
456 \fi
457
458 \edef\nmp@qIVandI{\fpeval{(\nmp@yStraddles && \xmin>=0) ? 1 : 0}}
459 \ifnum\nmp@qIVandI=1
460 \pgfplotsset{numodel/axis/.append style={
461   xlabel style={at={(\xticklabel cs:1.05)}, anchor=west}
462 }}
463 \fi
464
465 \ifdefined\xlabelqty\ifdefined\xlabelunit\xlabelbuild\fi\fi
466 \ifdefined\ylabelqty\ifdefined\ylabelunit\ylabelbuild\fi\fi
467 }
468
469 \newcommand{\drawplot}[1]{
470   \calcplotdims
471   \begin{tikzpicture}
472     \begin{axis}[
473       numodel/grid,
474       numodel/ticks,
475       numodel/axis,
476       xlabel=\xlabel,
477       ylabel=\ylabel,
478       xmin=\xmin, xmax=\xmax,
479       ymin=\ymin, ymax=\ymax,
480       xtick distance=\xtickdistance,
481       ytick distance=\ytickdistance,
482       width=\xcm cm,
483       height=\ycm cm,
484       scale only axis,
485       legend pos=outer north east
486     ]
487       #1
488     \end{axis}
489   \end{tikzpicture}

```

490 }
491
492 \makeatother