

The `magicnum` package

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Abstract

This packages allows to access magic numbers by a hierarchical name system.

Contents

1	Documentation	2
1.1	Introduction	2
1.2	User interface	2
1.2.1	<code>\magicnum</code>	2
1.2.2	Properties	3
1.3	Data	3
1.3.1	Category <code>tex.catcode</code>	3
1.3.2	Category <code>etex.grouptype</code>	3
1.3.3	Category <code>etex.ifttype</code>	4
1.3.4	Category <code>etex.nodetype</code>	4
1.3.5	Category <code>etex.interactionmode</code>	4
1.3.6	Category <code>luatex.pdfliteral.mode</code>	5
2	Implementation	5
2.1	Reload check and package identification	5
2.2	Catcodes	6
2.3	Check for previous definition	7
2.4	Without Lua \TeX	7
2.5	With Lua \TeX	8
2.6	Data	9
2.6.1	Plain data	9
2.6.2	Data for \TeX	10
2.6.3	Lua module	12
3	Test	16
3.1	Catcode checks for loading	16
3.2	Test data	18
3.3	Small test for ini \TeX	19
4	Installation	19
4.1	Download	19
4.2	Bundle installation	19
4.3	Package installation	19
4.4	Refresh file name databases	20
4.5	Some details for the interested	20

*Please report any issues at <https://github.com/ho-tex/magicnum/issues>

5 History	20
[2007/12/12 v1.0]	20
[2009/04/10 v1.1]	20
[2010/03/09 v1.2]	21
[2011/03/24 v1.3]	21
[2011/04/10 v1.4]	21
[2016/05/16 v1.5]	21
[2019/07/25 v1.6]	21
[2019/11/29 v1.7]	21
6 Index	21

1 Documentation

1.1 Introduction

Especially since ε -TeX there are many integer values with special meanings, such as catcodes, group types, ... Package `etex`, enabled by options, defines macros in the user namespace for these values.

This package goes another approach for storing the names and values.

- If LuaTeX is available, they are stored in Lua tables.
- Without LuaTeX they are remembered using internal macros.

1.2 User interface

The integer values and names are organized in a hierarchical scheme of categories with the property names as leaves. Example: ε -TeX's `\currentgrouplevel` reports 2 for a group caused by `\hbox`. This package has chosen to organize the group types in a main category `etex` and its subcategory `grouptype`:

```
etex.grouptype.hbox = 2
```

The property name `hbox` in category `etex.grouptype` has value 2. Dots are used to separate components.

If you want to have the value, the access key is constructed by the category with all its components and the property name. For the opposite the value is used instead of the property name.

Values are always integers (including negative numbers).

1.2.1 `\magicnum`

`\magicnum {⟨access key⟩}`

Macro `\magicnum` expects an access key as argument and expands to the requested data. The macro is always expandable. In case of errors the expansion result is empty.

The same macro is also used for getting a property name. In this case the property name part in the access key is replaced by the value.

The catcodes of the resulting numbers and strings follow TeX's tradition of `\string`, `\meaning`, ...: The space has catcode 10 (`tex.catcode.space`) and the other characters have catcode 12 (`tex.catcode.other`).

Examples:

```

\magicnum{etex.grouptype.hbox} ⇒ 2
\magicnum{tex.catcode.14} ⇒ comment
\magicnum{tex.catcode.undefined} ⇒ ∅

```

1.2.2 Properties

- The components of a category are either subcategories or key value pairs, but not both.
- The full specified property names are unique and thus has one integer value exactly.
- Also the values inside a category are unique. This condition is a prerequisite for the reverse mapping of `\magicnum`.
- All names start with a letter. Only letters or digits may follow.

1.3 Data

1.3.1 Category `tex.catcode`

<code>tex.catcode.escape</code>	0
<code>tex.catcode.begingroup</code>	1
<code>tex.catcode.endgroup</code>	2
<code>tex.catcode.math</code>	3
<code>tex.catcode.align</code>	4
<code>tex.catcode.eol</code>	5
<code>tex.catcode.parameter</code>	6
<code>tex.catcode.superscript</code>	7
<code>tex.catcode.subscript</code>	8
<code>tex.catcode.ignore</code>	9
<code>tex.catcode.space</code>	10
<code>tex.catcode.letter</code>	11
<code>tex.catcode.other</code>	12
<code>tex.catcode.active</code>	13
<code>tex.catcode.comment</code>	14
<code>tex.catcode.invalid</code>	15

1.3.2 Category `etex.grouptype`

<code>etex.grouptype.bottomlevel</code>	0
<code>etex.grouptype.simple</code>	1
<code>etex.grouptype.hbox</code>	2
<code>etex.grouptype.adjustedhbox</code>	3
<code>etex.grouptype.vbox</code>	4
<code>etex.grouptype.align</code>	5
<code>etex.grouptype.noalign</code>	6
<code>etex.grouptype.output</code>	8
<code>etex.grouptype.math</code>	9
<code>etex.grouptype.disc</code>	10
<code>etex.grouptype.insert</code>	11
<code>etex.grouptype.vcenter</code>	12
<code>etex.grouptype.mathchoice</code>	13
<code>etex.grouptype.semisimple</code>	14
<code>etex.grouptype.mathshift</code>	15
<code>etex.grouptype.mathleft</code>	16

1.3.3 Category etex.ifttype

etex.ifttype.none	0
etex.ifttype.char	1
etex.ifttype.cat	2
etex.ifttype.num	3
etex.ifttype.dim	4
etex.ifttype.odd	5
etex.ifttype.vmode	6
etex.ifttype.hmode	7
etex.ifttype.mmode	8
etex.ifttype.inner	9
etex.ifttype.void	10
etex.ifttype.hbox	11
etex.ifttype.vbox	12
etex.ifttype.x	13
etex.ifttype.eof	14
etex.ifttype.true	15
etex.ifttype.false	16
etex.ifttype.case	17
etex.ifttype.defined	18
etex.ifttype.csname	19
etex.ifttype.fontchar	20

1.3.4 Category etex.nodetype

etex.nodetype.none	-1
etex.nodetype.char	0
etex.nodetype.hlist	1
etex.nodetype.vlist	2
etex.nodetype.rule	3
etex.nodetype.ins	4
etex.nodetype.mark	5
etex.nodetype.adjust	6
etex.nodetype.ligature	7
etex.nodetype.disc	8
etex.nodetype.whatsit	9
etex.nodetype.math	10
etex.nodetype.glue	11
etex.nodetype.kern	12
etex.nodetype.penalty	13
etex.nodetype.unset	14
etex.nodetype.maths	15

1.3.5 Category etex.interactionmode

etex.interactionmode.batch	0
etex.interactionmode.nonstop	1
etex.interactionmode.scroll	2
etex.interactionmode.errorstop	3

1.3.6 Category luatex.pdfliteral.mode

```
luatex.pdfliteral.mode.setorigin 0
luatex.pdfliteral.mode.page      1
luatex.pdfliteral.mode.direct    2
```

2 Implementation

```
1 (*package)
```

2.1 Reload check and package identification

Reload check, especially if the package is not used with L^AT_EX.

```
2 \begingroup\catcode61\catcode48\catcode32=10\relax%
3 \catcode13=5 % ^~M
4 \endlinechar=13 %
5 \catcode35=6 % #
6 \catcode39=12 % '
7 \catcode44=12 % ,
8 \catcode45=12 % -
9 \catcode46=12 % .
10 \catcode58=12 % :
11 \catcode64=11 % @
12 \catcode123=1 % {
13 \catcode125=2 % }
14 \expandafter\let\expandafter\x\csname ver@magicnum.sty\endcsname
15 \ifx\x\relax % plain-TeX, first loading
16 \else
17 \def\empty{}%
18 \ifx\x\empty % LaTeX, first loading,
19 % variable is initialized, but \ProvidesPackage not yet seen
20 \else
21 \expandafter\ifx\csname PackageInfo\endcsname\relax
22 \def\x#1#2{%
23 \immediate\write-1{Package #1 Info: #2.}%
24 }%
25 \else
26 \def\x#1#2{\PackageInfo{#1}{#2, stopped}}%
27 \fi
28 \x{magicnum}{The package is already loaded}%
29 \aftergroup\endinput
30 \fi
31 \fi
32 \endgroup%
```

Package identification:

```
33 \begingroup\catcode61\catcode48\catcode32=10\relax%
34 \catcode13=5 % ^~M
35 \endlinechar=13 %
36 \catcode35=6 % #
37 \catcode39=12 % '
38 \catcode40=12 % (
39 \catcode41=12 % )
40 \catcode44=12 % ,
41 \catcode45=12 % -
42 \catcode46=12 % .
43 \catcode47=12 % /
44 \catcode58=12 % :
45 \catcode64=11 % @
```

```

46 \catcode91=12 % [
47 \catcode93=12 % ]
48 \catcode123=1 % {
49 \catcode125=2 % }
50 \expandafter\ifx\csname ProvidesPackage\endcsname\relax
51 \def\x#1#2#3[#4]{\endgroup
52 \immediate\write-1{Package: #3 #4}%
53 \xdef#1{#4}%
54 }%
55 \else
56 \def\x#1#2[#3]{\endgroup
57 #2[#3]}%
58 \ifx#1\@undefined
59 \xdef#1{#3}%
60 \fi
61 \ifx#1\relax
62 \xdef#1{#3}%
63 \fi
64 }%
65 \fi
66 \expandafter\x\csname ver@magicnum.sty\endcsname
67 \ProvidesPackage{magicnum}%
68 [2019/11/29 v1.7 Magic numbers (H0)]%

```

2.2 Catcodes

```

69 \begingroup\catcode61\catcode48\catcode32=10\relax%
70 \catcode13=5 % ^M
71 \endlinechar=13 %
72 \catcode123=1 % {
73 \catcode125=2 % }
74 \catcode64=11 % @
75 \def\x{\endgroup
76 \expandafter\edef\csname magicnum@AtEnd\endcsname{%
77 \endlinechar=\the\endlinechar\relax
78 \catcode13=\the\catcode13\relax
79 \catcode32=\the\catcode32\relax
80 \catcode35=\the\catcode35\relax
81 \catcode61=\the\catcode61\relax
82 \catcode64=\the\catcode64\relax
83 \catcode123=\the\catcode123\relax
84 \catcode125=\the\catcode125\relax
85 }%
86 }%
87 \x\catcode61\catcode48\catcode32=10\relax%
88 \catcode13=5 % ^M
89 \endlinechar=13 %
90 \catcode35=6 % #
91 \catcode64=11 % @
92 \catcode123=1 % {
93 \catcode125=2 % }
94 \def\TMP@EnsureCode#1#2{%
95 \edef\magicnum@AtEnd{%
96 \magicnum@AtEnd
97 \catcode#1=\the\catcode#1\relax
98 }%
99 \catcode#1=#2\relax
100 }

```

```

101 \TMP@EnsureCode{34}{12}% "
102 \TMP@EnsureCode{39}{12}% '
103 \TMP@EnsureCode{40}{12}% (
104 \TMP@EnsureCode{41}{12}% )
105 \TMP@EnsureCode{42}{12}% *
106 \TMP@EnsureCode{44}{12}% ,
107 \TMP@EnsureCode{45}{12}% -
108 \TMP@EnsureCode{46}{12}% .
109 \TMP@EnsureCode{47}{12}% /
110 \TMP@EnsureCode{58}{12}% :
111 \TMP@EnsureCode{60}{12}% <
112 \TMP@EnsureCode{62}{12}% >
113 \TMP@EnsureCode{91}{12}% [
114 \TMP@EnsureCode{93}{12}% ]
115 \edef\magicnum@AtEnd{\magicnum@AtEnd\noexpand\endinput}

```

2.3 Check for previous definition

```

116 \begingroup\expandafter\expandafter\expandafter\endgroup
117 \expandafter\ifx\csname newcommand\endcsname\relax
118   \expandafter\ifx\csname magicnum\endcsname\relax
119     \else
120       \input infwarerr.sty\relax
121       \@PackageError{magicnum}{%
122         \string\magicnum\space is already defined%
123       }\@ehc
124     \fi
125   \else
126     \newcommand*{\magicnum}{}%
127   \fi

```

2.4 Without LuaTeX

```

128 \begingroup\expandafter\expandafter\expandafter\endgroup
129 \expandafter\ifx\csname directlua\endcsname\relax
\magicnum
130 \begingroup\expandafter\expandafter\expandafter\endgroup
131 \expandafter\ifx\csname ifcsname\endcsname\relax
132   \def\magicnum#1{%
133     \expandafter\ifx\csname MG@#1\endcsname\relax
134       \else
135         \csname MG@#1\endcsname
136       \fi
137     }%
138   \else
139     \begingroup
140       \edef\x{\endgroup
141         \def\noexpand\magicnum##1{%
142           \expandafter\noexpand\csname
143             ifcsname\endcsname MG@##1\noexpand\endcsname
144             \noexpand\csname MG@##1%
145               \noexpand\expandafter\noexpand\endcsname
146             \expandafter\noexpand\csname fi\endcsname
147           }%
148         }%
149       \x
150     \fi
151   \else

```

2.5 With LuaTeX

```
152 \begingroup\expandafter\expandafter\expandafter\endgroup
153 \expandafter\ifx\csname RequirePackage\endcsname\relax
154   \input tex.sty\relax
155   \input infwarerr.sty\relax
156 \else
157   \RequirePackage{iftex}[2019/11/07]%
158   \RequirePackage{infwarerr}[2010/04/08]%
159 \fi

\magicnum@directlua
160 \ifnum\luatexversion<36 %
161   \def\magicnum@directlua{\directlua0 }%
162 \else
163   \let\magicnum@directlua\directlua
164 \fi

165 \magicnum@directlua{%
166   require("magicnum")%
167 }%
168 \begingroup
169   \def\x{2019/11/29 v1.7}%
170   \def\StripPrefix#1>{}%
171   \edef\x{\expandafter\StripPrefix\meaning\x}%
172   \edef\y{%
173     \magicnum@directlua{%
174       if oberdiek.magicnum.getversion then %
175         oberdiek.magicnum.getversion()%
176       end%
177     }%
178   }%
179   \ifx\x\y
180   \else
181     \@PackageError{magicnum}{%
182       Wrong version of lua module.\MessageBreak
183       Package version: \x\MessageBreak
184       Lua module: \y
185     }\@ehc
186   \fi
187 \endgroup

\luaescapestring
188 \begingroup
189   \expandafter\ifx\csname luaescapestring\endcsname\relax
190     \directlua{%
191       if tex.enableprimitives then %
192         tex.enableprimitives('magicnum@', {'luaescapestring'})%
193       end%
194     }%
195     \global\let\luaescapestring\magicnum@luaescapestring
196   \fi
197   \expandafter\ifx\csname luaescapestring\endcsname\relax
198     \escapechar=92 %
199     \@PackageError{magicnum}{%
200       Missing \string\luaescapestring
201     }\@ehc
202   \fi
203 \endgroup
```


\magicnum

```
204 \def\magicnum#1{%
205   \magicnum@directlua{%
206     oberdiek.magicnum.get("\luaescapestring{#1}")%
207   }%
208 }%

209 \expandafter\magicnum@AtEnd
210 \fi%
211 \</package>
```

2.6 Data

2.6.1 Plain data

```
212 \<*data>
213 tex.catcode
214   escape = 0
215   begingroup = 1
216   endgroup = 2
217   math = 3
218   align = 4
219   eol = 5
220   parameter = 6
221   superscript = 7
222   subscript = 8
223   ignore = 9
224   space = 10
225   letter = 11
226   other = 12
227   active = 13
228   comment = 14
229   invalid = 15
230 etex.grouptype
231   bottomlevel = 0
232   simple = 1
233   hbox = 2
234   adjustedhbox = 3
235   vbox = 4
236   align = 5
237   noalign = 6
238   output = 8
239   math = 9
240   disc = 10
241   insert = 11
242   vcenter = 12
243   mathchoice = 13
244   semisimple = 14
245   mathshift = 15
246   mathleft = 16
247 etex.iftype
248   none = 0
249   char = 1
250   cat = 2
251   num = 3
252   dim = 4
253   odd = 5
254   vmode = 6
```

```

255 hmode = 7
256 mmode = 8
257 inner = 9
258 void = 10
259 hbox = 11
260 vbox = 12
261 x = 13
262 eof = 14
263 true = 15
264 false = 16
265 case = 17
266 defined = 18
267 csname = 19
268 fontchar = 20
269 etex.nodetype
270 none = -1
271 char = 0
272 hlist = 1
273 vlist = 2
274 rule = 3
275 ins = 4
276 mark = 5
277 adjust = 6
278 ligature = 7
279 disc = 8
280 whatsit = 9
281 math = 10
282 glue = 11
283 kern = 12
284 penalty = 13
285 unset = 14
286 maths = 15
287 etex.interactionmode
288 batch = 0
289 nonstop = 1
290 scroll = 2
291 errorstop = 3
292 luatex.pdfliteral.mode
293 setorigin = 0
294 page = 1
295 direct = 2
296 </data>

```

2.6.2 Data for T_EX

```

297 (*package)

\magicnum@add

298 \begingroup\expandafter\expandafter\expandafter\endgroup
299 \expandafter\ifx\csname detokenize\endcsname\relax
300   \def\magicnum@add#1#2#3{%
301     \expandafter\magicnum@@add
302       \csname MG@#1.#2\expandafter\endcsname
303       \csname MG@#1.#3\endcsname
304       {#3}{#2}%
305   }%
306 \def\magicnum@@add#1#2#3#4{%
307   \def#1{#3}%
308   \def#2{#4}%
309   \edef#1{%

```

```

310     \expandafter\strip@prefix\meaning#1%
311     }%
312     \edef#2{%
313         \expandafter\strip@prefix\meaning#2%
314     }%
315 }%
316 \expandafter\ifx\csname strip@prefix\endcsname\relax
317     \def\strip@prefix#1->{%
318     \fi
319 \else
320     \def\magicnum@add#1#2#3{%
321         \expandafter\edef\csname MG@#1.#2\endcsname{%
322             \detokenize{#3}%
323         }%
324         \expandafter\edef\csname MG@#1.#3\endcsname{%
325             \detokenize{#2}%
326         }%
327     }%
328 \fi

329 \magicnum@add{tex.catcode}{escape}{0}
330 \magicnum@add{tex.catcode}{begingroup}{1}
331 \magicnum@add{tex.catcode}{endgroup}{2}
332 \magicnum@add{tex.catcode}{math}{3}
333 \magicnum@add{tex.catcode}{align}{4}
334 \magicnum@add{tex.catcode}{eol}{5}
335 \magicnum@add{tex.catcode}{parameter}{6}
336 \magicnum@add{tex.catcode}{superscript}{7}
337 \magicnum@add{tex.catcode}{subscript}{8}
338 \magicnum@add{tex.catcode}{ignore}{9}
339 \magicnum@add{tex.catcode}{space}{10}
340 \magicnum@add{tex.catcode}{letter}{11}
341 \magicnum@add{tex.catcode}{other}{12}
342 \magicnum@add{tex.catcode}{active}{13}
343 \magicnum@add{tex.catcode}{comment}{14}
344 \magicnum@add{tex.catcode}{invalid}{15}
345 \magicnum@add{etex.grouptype}{bottomlevel}{0}
346 \magicnum@add{etex.grouptype}{simple}{1}
347 \magicnum@add{etex.grouptype}{hbox}{2}
348 \magicnum@add{etex.grouptype}{adjustedhbox}{3}
349 \magicnum@add{etex.grouptype}{vbox}{4}
350 \magicnum@add{etex.grouptype}{align}{5}
351 \magicnum@add{etex.grouptype}{noalign}{6}
352 \magicnum@add{etex.grouptype}{output}{8}
353 \magicnum@add{etex.grouptype}{math}{9}
354 \magicnum@add{etex.grouptype}{disc}{10}
355 \magicnum@add{etex.grouptype}{insert}{11}
356 \magicnum@add{etex.grouptype}{vcenter}{12}
357 \magicnum@add{etex.grouptype}{mathchoice}{13}
358 \magicnum@add{etex.grouptype}{semisimple}{14}
359 \magicnum@add{etex.grouptype}{mathshift}{15}
360 \magicnum@add{etex.grouptype}{mathleft}{16}
361 \magicnum@add{etex.ifttype}{none}{0}
362 \magicnum@add{etex.ifttype}{char}{1}
363 \magicnum@add{etex.ifttype}{cat}{2}
364 \magicnum@add{etex.ifttype}{num}{3}
365 \magicnum@add{etex.ifttype}{dim}{4}
366 \magicnum@add{etex.ifttype}{odd}{5}
367 \magicnum@add{etex.ifttype}{vmode}{6}

```

```

368 \magicnum@add{etex.ifttype}{hmode}{7}
369 \magicnum@add{etex.ifttype}{mmode}{8}
370 \magicnum@add{etex.ifttype}{inner}{9}
371 \magicnum@add{etex.ifttype}{void}{10}
372 \magicnum@add{etex.ifttype}{hbox}{11}
373 \magicnum@add{etex.ifttype}{vbox}{12}
374 \magicnum@add{etex.ifttype}{x}{13}
375 \magicnum@add{etex.ifttype}{eof}{14}
376 \magicnum@add{etex.ifttype}{true}{15}
377 \magicnum@add{etex.ifttype}{false}{16}
378 \magicnum@add{etex.ifttype}{case}{17}
379 \magicnum@add{etex.ifttype}{defined}{18}
380 \magicnum@add{etex.ifttype}{csname}{19}
381 \magicnum@add{etex.ifttype}{fontchar}{20}
382 \magicnum@add{etex.nodetype}{none}{-1}
383 \magicnum@add{etex.nodetype}{char}{0}
384 \magicnum@add{etex.nodetype}{hlist}{1}
385 \magicnum@add{etex.nodetype}{vlist}{2}
386 \magicnum@add{etex.nodetype}{rule}{3}
387 \magicnum@add{etex.nodetype}{ins}{4}
388 \magicnum@add{etex.nodetype}{mark}{5}
389 \magicnum@add{etex.nodetype}{adjust}{6}
390 \magicnum@add{etex.nodetype}{ligature}{7}
391 \magicnum@add{etex.nodetype}{disc}{8}
392 \magicnum@add{etex.nodetype}{whatsit}{9}
393 \magicnum@add{etex.nodetype}{math}{10}
394 \magicnum@add{etex.nodetype}{glue}{11}
395 \magicnum@add{etex.nodetype}{kern}{12}
396 \magicnum@add{etex.nodetype}{penalty}{13}
397 \magicnum@add{etex.nodetype}{unset}{14}
398 \magicnum@add{etex.nodetype}{maths}{15}
399 \magicnum@add{etex.interactionmode}{batch}{0}
400 \magicnum@add{etex.interactionmode}{nonstop}{1}
401 \magicnum@add{etex.interactionmode}{scroll}{2}
402 \magicnum@add{etex.interactionmode}{errorstop}{3}
403 \magicnum@add{luatex.pdfliteral.mode}{setorigin}{0}
404 \magicnum@add{luatex.pdfliteral.mode}{page}{1}
405 \magicnum@add{luatex.pdfliteral.mode}{direct}{2}
406 \magicnum@AtEnd%
407 \endpackage

```

2.6.3 Lua module

```

408 (*lua)
409 oberdiek = oberdiek or {}
410 local magicnum = oberdiek.magicnum or {}
411 oberdiek.magicnum = magicnum
412 function magicnum.getversion()
413   tex.write("2019/11/29 v1.7")
414 end
415 local data = {
416   ["tex.catcode"] = {
417     [0] = "escape",
418     [1] = "begingroup",
419     [2] = "endgroup",
420     [3] = "math",
421     [4] = "align",

```

```

422 [5] = "eol",
423 [6] = "parameter",
424 [7] = "superscript",
425 [8] = "subscript",
426 [9] = "ignore",
427 [10] = "space",
428 [11] = "letter",
429 [12] = "other",
430 [13] = "active",
431 [14] = "comment",
432 [15] = "invalid",
433 ["active"] = 13,
434 ["align"] = 4,
435 ["begingroup"] = 1,
436 ["comment"] = 14,
437 ["endgroup"] = 2,
438 ["eol"] = 5,
439 ["escape"] = 0,
440 ["ignore"] = 9,
441 ["invalid"] = 15,
442 ["letter"] = 11,
443 ["math"] = 3,
444 ["other"] = 12,
445 ["parameter"] = 6,
446 ["space"] = 10,
447 ["subscript"] = 8,
448 ["superscript"] = 7
449 },
450 ["etex.grouptype"] = {
451 [0] = "bottomlevel",
452 [1] = "simple",
453 [2] = "hbox",
454 [3] = "adjustedhbox",
455 [4] = "vbox",
456 [5] = "align",
457 [6] = "noalign",
458 [8] = "output",
459 [9] = "math",
460 [10] = "disc",
461 [11] = "insert",
462 [12] = "vcenter",
463 [13] = "mathchoice",
464 [14] = "semisimple",
465 [15] = "mathshift",
466 [16] = "mathleft",
467 ["adjustedhbox"] = 3,
468 ["align"] = 5,
469 ["bottomlevel"] = 0,
470 ["disc"] = 10,
471 ["hbox"] = 2,
472 ["insert"] = 11,
473 ["math"] = 9,
474 ["mathchoice"] = 13,
475 ["mathleft"] = 16,
476 ["mathshift"] = 15,
477 ["noalign"] = 6,
478 ["output"] = 8,
479 ["semisimple"] = 14,

```

```

480     ["simple"] = 1,
481     ["vbox"] = 4,
482     ["vcenter"] = 12
483 },
484 ["etex.ifttype"] = {
485     [0] = "none",
486     [1] = "char",
487     [2] = "cat",
488     [3] = "num",
489     [4] = "dim",
490     [5] = "odd",
491     [6] = "vmode",
492     [7] = "hmode",
493     [8] = "mmode",
494     [9] = "inner",
495     [10] = "void",
496     [11] = "hbox",
497     [12] = "vbox",
498     [13] = "x",
499     [14] = "eof",
500     [15] = "true",
501     [16] = "false",
502     [17] = "case",
503     [18] = "defined",
504     [19] = "csname",
505     [20] = "fontchar",
506     ["case"] = 17,
507     ["cat"] = 2,
508     ["char"] = 1,
509     ["csname"] = 19,
510     ["defined"] = 18,
511     ["dim"] = 4,
512     ["eof"] = 14,
513     ["false"] = 16,
514     ["fontchar"] = 20,
515     ["hbox"] = 11,
516     ["hmode"] = 7,
517     ["inner"] = 9,
518     ["mmode"] = 8,
519     ["none"] = 0,
520     ["num"] = 3,
521     ["odd"] = 5,
522     ["true"] = 15,
523     ["vbox"] = 12,
524     ["vmode"] = 6,
525     ["void"] = 10,
526     ["x"] = 13
527 },
528 ["etex.nodetype"] = {
529     [-1] = "none",
530     [0] = "char",
531     [1] = "hlist",
532     [2] = "vlist",
533     [3] = "rule",
534     [4] = "ins",
535     [5] = "mark",
536     [6] = "adjust",
537     [7] = "ligature",

```

```

538     [8] = "disc",
539     [9] = "whatsit",
540     [10] = "math",
541     [11] = "glue",
542     [12] = "kern",
543     [13] = "penalty",
544     [14] = "unset",
545     [15] = "maths",
546     ["adjust"] = 6,
547     ["char"] = 0,
548     ["disc"] = 8,
549     ["glue"] = 11,
550     ["hlist"] = 1,
551     ["ins"] = 4,
552     ["kern"] = 12,
553     ["ligature"] = 7,
554     ["mark"] = 5,
555     ["math"] = 10,
556     ["maths"] = 15,
557     ["none"] = -1,
558     ["penalty"] = 13,
559     ["rule"] = 3,
560     ["unset"] = 14,
561     ["vlist"] = 2,
562     ["whatsit"] = 9
563 },
564 ["etex.interactionmode"] = {
565     [0] = "batch",
566     [1] = "nonstop",
567     [2] = "scroll",
568     [3] = "errorstop",
569     ["batch"] = 0,
570     ["errorstop"] = 3,
571     ["nonstop"] = 1,
572     ["scroll"] = 2
573 },
574 ["luatex.pdfliteral.mode"] = {
575     [0] = "setorigin",
576     [1] = "page",
577     [2] = "direct",
578     ["direct"] = 2,
579     ["page"] = 1,
580     ["setorigin"] = 0
581 }
582 }

583 function magicnum.get(name)
584     local startpos, endpos, category, entry =
585         string.find(name, "^(%a[%a%d%.]*)%.(-?[%a%d]+)$")
586     if not entry then
587         return
588     end
589     local node = data[category]
590     if not node then
591         return
592     end
593     local num = tonumber(entry)
594     local value
595     if num then

```

```

596     value = node[num]
597     if not value then
598         return
599     end
600 else
601     value = node[entry]
602     if not value then
603         return
604     end
605     value = "" .. value
606 end
607 tex.write(value)
608 end
609 </lua>

```

3 Test

3.1 Catcode checks for loading

```

610 <*test1>
611 \catcode'\{=1 %
612 \catcode'\}=2 %
613 \catcode'\#=6 %
614 \catcode'\@=11 %
615 \expandafter\ifx\csname count@\endcsname\relax
616 \countdef\count@=255 %
617 \fi
618 \expandafter\ifx\csname @gobble\endcsname\relax
619 \long\def@gobble#1{}%
620 \fi
621 \expandafter\ifx\csname @firstofone\endcsname\relax
622 \long\def@firstofone#1{#1}%
623 \fi
624 \expandafter\ifx\csname loop\endcsname\relax
625 \expandafter@firstofone
626 \else
627 \expandafter@gobble
628 \fi
629 {%
630 \def\loop#1\repeat{%
631 \def\body{#1}%
632 \iterate
633 }%
634 \def\iterate{%
635 \body
636 \let\next\iterate
637 \else
638 \let\next\relax
639 \fi
640 \next
641 }%
642 \let\repeat=\fi
643 }%
644 \def\RestoreCatcodes{}
645 \count@=0 %
646 \loop
647 \edef\RestoreCatcodes{%
648 \RestoreCatcodes

```



```

649 \catcode\the\count@=\the\catcode\count@\relax
650 }%
651 \ifnum\count@<255 %
652 \advance\count@ 1 %
653 \repeat
654
655 \def\RangeCatcodeInvalid#1#2{%
656 \count@=#1\relax
657 \loop
658 \catcode\count@=15 %
659 \ifnum\count@<#2\relax
660 \advance\count@ 1 %
661 \repeat
662 }
663 \def\RangeCatcodeCheck#1#2#3{%
664 \count@=#1\relax
665 \loop
666 \ifnum#3=\catcode\count@
667 \else
668 \errmessage{%
669 Character \the\count@\space
670 with wrong catcode \the\catcode\count@\space
671 instead of \number#3%
672 }%
673 \fi
674 \ifnum\count@<#2\relax
675 \advance\count@ 1 %
676 \repeat
677 }
678 \def\space{ }
679 \expandafter\ifx\csname LoadCommand\endcsname\relax
680 \def\LoadCommand{\input magicnum.sty\relax}%
681 \fi
682 \def\Test{%
683 \RangeCatcodeInvalid{0}{47}%
684 \RangeCatcodeInvalid{58}{64}%
685 \RangeCatcodeInvalid{91}{96}%
686 \RangeCatcodeInvalid{123}{255}%
687 \catcode'\@=12 %
688 \catcode'\=0 %
689 \catcode'\%=14 %
690 \LoadCommand
691 \RangeCatcodeCheck{0}{36}{15}%
692 \RangeCatcodeCheck{37}{37}{14}%
693 \RangeCatcodeCheck{38}{47}{15}%
694 \RangeCatcodeCheck{48}{57}{12}%
695 \RangeCatcodeCheck{58}{63}{15}%
696 \RangeCatcodeCheck{64}{64}{12}%
697 \RangeCatcodeCheck{65}{90}{11}%
698 \RangeCatcodeCheck{91}{91}{15}%
699 \RangeCatcodeCheck{92}{92}{0}%
700 \RangeCatcodeCheck{93}{96}{15}%
701 \RangeCatcodeCheck{97}{122}{11}%
702 \RangeCatcodeCheck{123}{255}{15}%
703 \RestoreCatcodes
704 }
705 \Test
706 \csname @@end\endcsname

```

```

707 \end
708 </test1>
3.2 Test data
709 <*testplain>
710 \input magicnum.sty\relax
711 \def\Test#1#2{%
712   \edef\result{\magicnum{#1}}%
713   \edef\expect{#2}%
714   \edef\expect{\expandafter\stripprefix\meaning\expect}%
715   \ifx\result\expect
716     \else
717     \errmessage{%
718       Failed: [#1] % hash-ok
719       returns [\result] instead of [\expect]%
720     }%
721   \fi
722 }
723 \def\stripprefix#1->{}
724 </testplain>
725 <*testlatex>
726 \NeedsTeXFormat{LaTeX2e}
727 \documentclass{minimal}
728 \usepackage{magicnum}[2016/05/16]
729 \usepackage{qstest}
730 \IncludeTests{*}
731 \LogTests{log}{*}{*}
732 \newcommand*\Test}[2]{%
733   \Expect*\{ \magicnum{#1} \}{#2}%
734 }
735 \begin{qstest}{magicnum}{magicnum}
736 </testlatex>
737 <*testdata>
738 \Test{tex.catcode.escape}{0}
739 \Test{tex.catcode.invalid}{15}
740 \Test{tex.catcode.unknown}{}
741 \Test{tex.catcode.0}{escape}
742 \Test{tex.catcode.15}{invalid}
743 \Test{etex.iftypes.true}{15}
744 \Test{etex.iftypes.false}{16}
745 \Test{etex.iftypes.15}{true}
746 \Test{etex.iftypes.16}{false}
747 \Test{etex.nodetypes.none}{-1}
748 \Test{etex.nodetypes.-1}{none}
749 \Test{luatex.pdfliteral.mode.direct}{2}
750 \Test{luatex.pdfliteral.mode.1}{page}
751 \Test{}{}
752 \Test{unknown}{}
753 \Test{unknown.foo.bar}{}
754 \Test{unknown.foo.4}{}
755 </testdata>
756 <*testplain>
757 \csname @@end\endcsname
758 \end
759 </testplain>
760 <*testlatex>

```

```

761 \end{qstest}
762 \csname @@end\endcsname
763 </testlatex>

```

3.3 Small test for \LaTeX

```

764 (*test4)
765 \catcode'\{=1
766 \catcode'\}=2
767 \catcode'\#=6
768 \input magicnum.sty\relax
769 \edef\x{\magicnum{tex.catcode.15}}
770 \edef\y{invalid}
771 \def\Strip#1>{}
772 \edef\y{\expandafter\Strip\meaning\y}
773 \ifx\x\y
774 \immediate\write16{0k}%
775 \else
776 \errmessage{\x<>\y}%
777 \fi
778 \csname @@end\endcsname\end
779 </test4>

```

4 Installation

4.1 Download

Package. This package is available on CTAN¹:

[CTAN:macros/latex/contrib/magicnum/magicnum.dtx](#) The source file.

[CTAN:macros/latex/contrib/magicnum/magicnum.pdf](#) Documentation.

Bundle. All the packages of the bundle ‘magicnum’ are also available in a TDS compliant ZIP archive. There the packages are already unpacked and the documentation files are generated. The files and directories obey the TDS standard.

[CTAN:install/macros/latex/contrib/magicnum.tds.zip](#)

TDS refers to the standard “A Directory Structure for \TeX Files” ([CTAN:pkg/tds](#)). Directories with `texmf` in their name are usually organized this way.

4.2 Bundle installation

Unpacking. Unpack the `magicnum.tds.zip` in the TDS tree (also known as `texmf` tree) of your choice. Example (linux):

```
unzip magicnum.tds.zip -d ~/texmf
```

Script installation. Check the directory `TDS:scripts/magicnum/` for scripts that need further installation steps.

4.3 Package installation

Unpacking. The `.dtx` file is a self-extracting docstrip archive. The files are extracted by running the `.dtx` through plain \TeX :

```
tex magicnum.dtx
```

¹[CTAN:pkg/magicnum](#)

TDS. Now the different files must be moved into the different directories in your installation TDS tree (also known as `texmf` tree):

```
magicnum.sty      → tex/generic/magicnum/magicnum.sty
magicnum.lua      → scripts/magicnum/magicnum.lua
magicnum.magicnum.lua → scripts/magicnum/magicnum.magicnum.lua
magicnum.pdf      → doc/latex/magicnum/magicnum.pdf
magicnum.txt      → doc/latex/magicnum/magicnum.txt
magicnum.dtx      → source/latex/magicnum/magicnum.dtx
```

If you have a `docstrip.cfg` that configures and enables `docstrip`'s TDS installing feature, then some files can already be in the right place, see the documentation of `docstrip`.

4.4 Refresh file name databases

If your `TeX` distribution (`TeX Live`, `mikTeX`, ...) relies on file name databases, you must refresh these. For example, `TeX Live` users run `texhash` or `mktextlsr`.

4.5 Some details for the interested

Unpacking with \LaTeX . The `.dtx` chooses its action depending on the format:

plain `TeX`: Run `docstrip` and extract the files.

\LaTeX : Generate the documentation.

If you insist on using \LaTeX for `docstrip` (really, `docstrip` does not need \LaTeX), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{magicnum.dtx}
```

Do not forget to quote the argument according to the demands of your shell.

Generating the documentation. You can use both the `.dtx` or the `.drv` to generate the documentation. The process can be configured by the configuration file `ltxdoc.cfg`. For instance, put this line into this file, if you want to have A4 as paper format:

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with `pdf \LaTeX` :

```
pdflatex magicnum.dtx
makeindex -s gind.ist magicnum.idx
pdflatex magicnum.dtx
makeindex -s gind.ist magicnum.idx
pdflatex magicnum.dtx
```

5 History

[2007/12/12 v1.0]

- First public version.

[2009/04/10 v1.1]

- Adaptation to `LuaTeX` 0.40.

[2010/03/09 v1.2]

- Adaptation to package luatex 0.4.

[2011/03/24 v1.3]

- Catcode fixes.

[2011/04/10 v1.4]

- Compatibility for iniT_EX.
- Dependency from package luatex removed.
- Version check for lua module.

[2016/05/16 v1.5]

- Documentation updates.

[2019/07/25 v1.6]

- remove uses of module function, see PR70

[2019/11/29 v1.7]

- Documentation updates.
- Use iftex directly.

6 Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; plain numbers refer to the code lines where the entry is used.

Symbols	C
<code>\#</code> 613, 767	<code>\catcode</code> 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 69, 70, 72, 73, 74, 78, 79, 80, 81, 82, 83, 84, 87, 88, 90, 91, 92, 93, 97, 99, 611, 612, 613, 614, 649, 658, 666, 670, 687, 688, 689, 765, 766, 767
<code>\%</code> 689	<code>\count@</code> 616, 645, 649, 651, 652, 656, 658, 659, 660, 664, 666, 669, 670, 674, 675
<code>\@</code> 614, 687	<code>\countdef</code> 616
<code>\@PackageError</code> 121, 181, 199	<code>\csname</code> 14, 21, 50, 66, 76, 117, 118, 129, 131, 133, 135, 142, 144, 146, 153, 189, 197, 299, 302, 303, 316, 321, 324, 615, 618, 621, 624, 679, 706, 757, 762, 778
<code>\@ehc</code> 123, 185, 201	
<code>\@firstofone</code> 622, 625	
<code>\@gobble</code> 619, 627	
<code>\@undefined</code> 58	
<code>\</code> 688	
<code>\{</code> 611, 765	
<code>\}</code> 612, 766	
A	
<code>\advance</code> 652, 660, 675	
<code>\aftergroup</code> 29	
B	
<code>\begin</code> 735	
<code>\body</code> 631, 635	
D	
<code>\detokenize</code> 322, 325	

<code>\directlua</code>	161, 163, 190	<code>\magicnum@luaescapestring</code>	195
<code>\documentclass</code>	727	<code>\meaning</code>	171, 310, 313, 714, 772
		<code>\MessageBreak</code>	182, 183
E			
<code>\empty</code>	17, 18	N	
<code>\end</code>	707, 758, 761, 778	<code>\NeedsTeXFormat</code>	726
<code>\endcsname</code> 14, 21, 50, 66, 76, 117, 118,		<code>\newcommand</code>	126, 732
129, 131, 133, 135, 143, 145,		<code>\next</code>	636, 638, 640
146, 153, 189, 197, 299, 302,		<code>\number</code>	671
303, 316, 321, 324, 615, 618,		P	
621, 624, 679, 706, 757, 762, 778		<code>\PackageInfo</code>	26
<code>\endinput</code>	29, 115	<code>\ProvidesPackage</code>	19, 67
<code>\endlinechar</code>	4, 35, 71, 77, 89	R	
<code>\errmessage</code>	668, 717, 776	<code>\RangeCatcodeCheck</code>	
<code>\escapechar</code>	198	. 663, 691, 692, 693, 694, 695,	
<code>\Expect</code>	733	696, 697, 698, 699, 700, 701, 702	
<code>\expect</code>	713, 714, 715, 719	<code>\RangeCatcodeInvalid</code>	
I			
<code>\ifnum</code>	160, 651, 659, 666, 674 655, 683, 684, 685, 686	
<code>\ifx</code>	15, 18, 21, 50,	<code>\repeat</code>	630, 642, 653, 661, 676
58, 61, 117, 118, 129, 131, 133,		<code>\RequirePackage</code>	157, 158
153, 179, 189, 197, 299, 316,		<code>\RestoreCatcodes</code> ..	644, 647, 648, 703
615, 618, 621, 624, 679, 715, 773		<code>\result</code>	712, 715, 719
<code>\immediate</code>	23, 52, 774	S	
<code>\IncludeTests</code>	730	<code>\space</code>	122, 669, 670, 678
<code>\input</code>	120, 154, 155, 680, 710, 768	<code>\Strip</code>	771, 772
<code>\iterate</code>	632, 634, 636	<code>\strip@prefix</code>	310, 313, 317
L			
<code>\LoadCommand</code>	680, 690	<code>\StripPrefix</code>	170, 171
<code>\LogTests</code>	731	<code>\stripprefix</code>	714, 723
<code>\loop</code>	630, 646, 657, 665	T	
<code>\luaescapestring</code>	188, 206	<code>\Test</code>	682, 705,
<code>\luatexversion</code>	160	711, 732, 738, 739, 740, 741,	
M			
<code>\magicnum</code>	2,	742, 743, 744, 745, 746, 747,	
122, 126, 130, 204, 712, 733, 769		748, 749, 750, 751, 752, 753, 754	
<code>\magicnum@add</code>	301, 306	<code>\the</code>	77, 78, 79,
<code>\magicnum@add</code> 298, 329, 330, 331, 332,		80, 81, 82, 83, 84, 97, 649, 669, 670	
333, 334, 335, 336, 337, 338,		<code>\TMP@EnsureCode</code>	94, 101,
339, 340, 341, 342, 343, 344,		102, 103, 104, 105, 106, 107,	
345, 346, 347, 348, 349, 350,		108, 109, 110, 111, 112, 113, 114	
351, 352, 353, 354, 355, 356,		U	
357, 358, 359, 360, 361, 362,		<code>\usepackage</code>	728, 729
363, 364, 365, 366, 367, 368,		W	
369, 370, 371, 372, 373, 374,		<code>\write</code>	23, 52, 774
375, 376, 377, 378, 379, 380,		X	
381, 382, 383, 384, 385, 386,		<code>\x</code>	14, 15, 18, 22, 26,
387, 388, 389, 390, 391, 392,		28, 51, 56, 66, 75, 87, 140, 149,	
393, 394, 395, 396, 397, 398,		169, 171, 179, 183, 769, 773, 776	
399, 400, 401, 402, 403, 404, 405		Y	
<code>\magicnum@AtEnd</code> .	95, 96, 115, 209, 406	<code>\y</code> ...	172, 179, 184, 770, 772, 773, 776
<code>\magicnum@directlua</code> 160, 165, 173, 205			