

The **erw-l3** package*

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Released 2020/04/27

Abstract

expl3-like utilities. Some redundant (for sport), some not.

Résumé

Logiciels utilitaires de type **expl3**. Certains redondants (pour le sport), d'autres pas.

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*(version v0.7, last revised 2020/04/27).

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2	int	4
	2.	4
3	numberdd cs	4
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Part I

Usage

<code>\usepackage</code>	<code>\usepackage{erw-l3}</code>
--------------------------	----------------------------------

Requirement

1. `erw-l3.sty` and its dependencies are in the path of the \LaTeX engine. See Part II, section 3.
2. Declare it in the *preamble*

Part II

Other

1 Acknowledgment

This work has benefited from Q&A's from the L^AT_EXcommunity[2]

2 Install

- 1) Compile `erw-13.dtx` (under Unix, `$tex erw-13.dtx`)
- 2) Put the generated `erw-13.sty` in the search path of the L^AT_EXengine

3 Support

This package is available from <https://www.ctan.org/pkg/erw-13> and <https://github.com/rogard/erw-13>.

4 Test

4.1 Platform

- i)* Linux laptop 4.15.0-20-generic #21-Ubuntu SMP Tue Apr 24
↪ 06:16:15 UTC 2018 x86_64 x86_64 x86_64 GNU/Linux

4.2 Engine

- a)* pdfTeX 3.14159265-2.6-1.40.20 (TeX Live 2019)
- b)* pdfTeX 3.14159265-2.6-1.40.21 (TeX Live 2020)
- c)* LuaHBTeX, Version 1.12.0 (TeX Live 2020)
- d)* XeTeX 3.14159265-2.6-0.999992 (TeX Live 2020)

4.3 Results

- 1) erw-l3 v0.7 compiles satisfactorily on platform *i)* and engines *b)*, *c)*, and *d)*

4.4 TODO

1. Complete Part I

References

- [1] The L^AT_EX3 Project Team *The L^AT_EX3 interfaces*, 2019, <http://ftp.math.purdue.edu/mirrors/ctan.org/macros/latex/contrib/l3kernel/interface3.pdf>
- [2] <https://tex.stackexchange.com/users/112708/erwann?tab=questions>

Part III

Listing

1 basics

Listing 1.
f(X)

2 int

Listing 2.
234512345

3 numberdd cs

Listing 3. TODO
$h\{g[f(X)]\}$

4 oper

Listing 4.
$h\{g[f(X)]\}$ $h\{g[f(X)]\}$

Listing 5.
$h\{g[f(X)]\}$ $h\{g[f(X)]\}$

Listing 6.

```
X
f(X)
g[f(X)]
h{g[f(X)]}
```

Listing 7. TODO

```
X
f(X)
g[f(X)]
h{g[f(X)]}
```

Listing 8.

```
h{g[f(X)]}
```

Listing 9.

```
f(X)
g[f(X)]
```

5 sys

Listing 10. sys

```
20200427
1343beb
1817
719
erw-l3-1343beb-719
```

6 **tl**

Listing 11.
TF

Listing 12.
abracadabracadabracadabra

Listing 13.
a==b==c

Listing 14.
(a)(b)(c)

Listing 15.
(a)(b)(c)

Listing 16.
(a)(b)(c)

Listing 17.
(a)(b)(c)(d)(e)(f) (a+A)(b+B)(c+C)(d+D)(e+E)(f+F) (a+A+k)(b+B+l)(c+C+m)(d+D+n)(e+E+o)(f+F+p) (a+A+k+K)(b+B+l+L)(c+C+m+M)(d+D+n+N)(e+E+o+O)(f+F+p+P)

Listing 18.
(1+a)(2+b)(3+c)

Part IV

Implementation

1 Opening

```
1 <@@=erw>
2 \ExplSyntaxOn
```

2 basics

```
3 \cs_set:Npn \__erw_cs_name:N #1
4 {
5   \exp_last_unbraced:Nf \use_i:nnn {\cs_split_function:N #1}
6 }
7 \cs_set:Npn \erw_cs_apply:Nnn #1 #2 #3
8 {
9   #1{#2}{#3}
10 }
11 \cs_set:Npn \erw_cs_apply:Nnnn #1 #2 #3 #4
12 {
13   #1{#2}{#3}{#4}
14 }
15 \cs_set:Npn \erw_cs_apply:Nnnnn #1 #2 #3 #4 #5
16 {
17   #1{#2}{#3}{#4}{#5}
18 }
19 \cs_set:Npn \erw_cs_apply:Nn
20 #1 % fun
21 #2 % t1
22 {
23   #1{#2}
24 }
25 \cs_generate_variant:Nn \erw_cs_apply:Nn {No, Nf, Nx, c}
26 \cs_set:Npn \erw_cs_set_eq:NN #1 #2
27 {
28   \cs_set:Npn #1 ##1{#2{##1}}
29 }
30 \cs_generate_variant:Nn \erw_cs_set_eq:NN {cN}
31 \cs_set:Npn \erw_cs_gset_eq:NN #1 #2
32 {
33   \cs_gset:Npn #1 ##1{#2{##1}}
34 }
35 \cs_generate_variant:Nn \erw_cs_gset_eq:NN {cN}
36 \cs_set:Npn \erw_cs_set_inline:Nn #1 #2
37 {
38   \cs_set:Npn #1 ##1{#2}
39 }
40 \cs_generate_variant:Nn \erw_cs_set_inline:Nn {cn}
41 \cs_set:Npn \erw_cs_gset_inline:Nn #1 #2
42 {
43   \cs_gset:Npn #1 ##1{#2}
44 }
```

```

45 \cs_generate_variant:Nn \erw_cs_gset_inline:Nn {cn}
46 \cs_set:Npn \erw_identity:n #1{#1}

```

3 int

```

47 \cs_set:Npn \__erw_int_range:nnn #1 #2 #3
48 {
49   \int_compare:nNnTF
50   {
51     \int_eval:n{#2+1}
52   }>{#3}
53   {
54     {#1}
55   }
56   {
57     \__erw_int_range:nnn
58     {
59       \exp_args:Nx\erw_accum:nn{#1}
60       {
61         \int_eval:n{#2+1}
62       }
63     }
64     {\int_eval:n{#2+1}}
65     {#3}
66   }
67 }
68 \cs_set:Npn \erw_int_range:nn #1 #2
69 {
70   \__erw_int_range:nnn {{#1}}{#1}{#2}
71 }
72 \cs_set:Npn \erw_int_range:n #1
73 {
74   \__erw_int_range:nnn {}{0}{#1}
75 % ^^A Alt to:
76 % ^^A   \int_step_inline:nn {#1}{##1}
77 }

```

4 oper

```

78 \cs_set:Npn \erw_accum:nn #1 #2
79 {
80   {#1{#2}}
81 }
82 \cs_set:Npn \erw_compose:NnV
83 #1 % method
84 #2 % funs
85 #3 % var
86 {
87   \erw_cs_set_inline:Nn \__erw_map:n
88   {
89     #1{##1}#3
90   }
91   \exp_args:Nf\erw_map:n
92   {

```

```

93     \tl_reverse:n{#2}
94   }
95 }
96 \cs_set:Npn \erw_compose:nV #1 #2
97 {
98   \erw_compose:NnV \erw_fold:NV {#1} #2
99 }
100 \cs_set:Npn \erw_compose_c:nV #1 #2
101 {
102   \erw_compose:NnV \erw_fold:cV {#1} #2
103 }
104 \tl_new:N \g__erw_compose_tl
105 \cs_set:Npn \erw_compose:nn #1 #2
106 {
107   \tl_set:Nn \g__erw_compose_tl {#2}
108   \erw_compose:nV{#1}\g__erw_compose_tl
109   \g__erw_compose_tl
110 }
111 \cs_set:Npn \erw_compose_c:nn #1 #2
112 {
113   \tl_set:Nn \g__erw_compose_tl {#2}
114   \erw_compose_c:nV{#1}\g__erw_compose_tl
115   \g__erw_compose_tl
116 }
117 \cs_set:Npn \erw_compose_vers:nV #1 #2
118 {
119   \msg_error:nnn{erw}{generic}{erw_compose_vers:nV~yet-to-be~implemented}
120 }
121 \cs_set:Npn \erw_compose_vers:nn #1 #2
122 {
123   \erw_cs_no_reset:{}
124   \tl_map_function:nN{#1}\erw_cs_no_new:n
125   \exp_last_unbraced:Nx
126   \erw_compose_c:nn
127   {{\erw_cs_no_names_braced:{}}}
128   {#2}
129 }
130 \cs_set:Npn \erw_compose_seq:nV #1 #2
131 {
132   \erw_compose:NnV \erw_seq_fold:NV {#1} #2
133 }
134 \cs_set:Npn \erw_compose_seq_c:nV
135 #1 % funs
136 #2 % seq
137 {
138   \erw_compose:NnV \erw_seq_fold:cV {#1} #2
139 }
140 \cs_set:Npn \erw_compose_seq_vers:nV #1 #2
141 {
142   \msg_error:nnn{erw}{generic}{erw_compose_seq_vers:nV~yet-to-be~implemented}
143 }
144 \tl_new:N \g__erw_seq_fold_item_tl
145 \cs_set:Npn \erw_seq_fold:NV
146 #1 % fun

```

```

147 #2 % seq
148 {
149   \seq_get_right:NN #2 \g__erw_seq_fold_item_tl
150   \erw_fold:NV #1 \g__erw_seq_fold_item_tl
151   \seq_put_right:No #2 {\g__erw_seq_fold_item_tl}
152 }
153 \cs_generate_variant:Nn \erw_seq_fold:NV {cV}
154 \cs_set:Npn \erw_fold:NV
155 #1 % fun
156 #2 % var
157 {
158   \use:c{tl_set:\g__erw_fold_set_par_tl}
159   #2
160   {\use:c{erw_cs_apply:\g__erw_fold_apply_par_tl}{#1}{#2}}
161 }
162 \cs_generate_variant:Nn \erw_fold:NV {cV}

```

5 sys

__erw_sys_date:

```

163 \cs_new:Nn \__erw_sys_date:
164 {
165   \int_eval:n
166   {
167     \c_sys_year_int * 10000
168     +\c_sys_month_int * 100
169     +\c_sys_day_int * 1
170   }
171 }

```

(End definition for __erw_sys_date:.)

\erw_sys_date:

```

172 \cs_new:Nn\erw_sys_date:{\__erw_sys_date:}

```

__erw_sys_date_hex:

```

173 \cs_new:Nn \__erw_sys_date_hex:
174 {\int_to_hex:n{\__erw_sys_date:}}

```

(End definition for __erw_sys_date_hex:.)

\erw_sys_date_hex:

```

175 \cs_new:Nn\erw_sys_date_hex:{\__erw_sys_date_hex:}

```

__erw_sys_filename:

```

176 \cs_new:Nn\__erw_sys_filename:
177 {
178   \c_sys_jobname_str--
179   \__erw_sys_date_hex:--
180   \__erw_sys_time_hex:
181 }

```

(End definition for _erw_sys_filename:.)

\erw_sys_filename:

182 \cs_new:Nn\erw_sys_filename:{_erw_sys_filename:}

_erw_sys_time:

183 \cs_new:Nn _erw_sys_time:
184 {
185 \int_eval:n
186 {
187 \c_sys_hour_int * 100
188 +\c_sys_minute_int * 1
189 }
190 }

(End definition for _erw_sys_time:.)

191 \cs_new:Nn\erw_sys_time:{_erw_sys_time:}

_erw_sys_time_hex:

192 \cs_new:Nn_erw_sys_time_hex:
193 {\int_to_hex:n{_erw_sys_time:}}

(End definition for _erw_sys_time_hex:.)

194 \cs_new:Nn \erw_sys_time_hex:{_erw_sys_time_hex:}

6 tl

195 \prg_set_conditional:Npnn \erw_is_matrix:n #1 { p, TF }
196 {
197 \erw_gset_map_inline:n{==\tl_count:n{##1}}
198 \int_compare:nTF
199 {
200 \exp_args:Nf\tl_count:n{\tl_head:n{#1}}
201 \exp_args:Nf \erw_map:n
202 {
203 \tl_tail:n{#1}
204 }
205 }
206 {\prg_return_true:}
207 {\prg_return_false:}
208 }
209 \cs_set:Npn \erw_gset_map:N #1
210 {
211 \erw_cs_gset_eq:NN _erw_map:n #1
212 }
213 \cs_set:Npn \erw_gset_map_inline:n #1
214 {
215 \erw_cs_gset_inline:Nn _erw_map:n {#1}
216 }

```

217 \cs_set:Npn \erw_last_item:n #1
218 {
219   \exp_args:Nof \tl_item:nn
220   {#1}
221   {
222     \tl_count:n{#1}
223   }
224 }

225 \cs_set:Npn \erw_map:n #1
226 {
227   \__erw_map:nn#1\q_recursion_tail\q_recursion_stop\q_recursion_tail\q_recursion_stop
228 }

229 \cs_set:Npn \__erw_map:nn #1 #2
230 {
231   \quark_if_recursion_tail_stop:n{#1}
232   \__erw_map:n{#1} \__erw_map:nn{#2}
233 }

234 \cs_new:Npn \__erw_map:n #1
235 {
236   \msg_error:nnn
237   {erw}
238   {generic}
239   {__erw_map:n~not~set}
240 }

241 \cs_set:Npn \erw_map:Nn
242 #1 % fun
243 #2 % tl
244 {
245   \erw_cs_set_eq:NN \__erw_map:n #1
246   \erw_map:n{#2}
247 }

248 \cs_set:Npn \erw_map_inline:nn
249 #1 % inl
250 #2 % tl
251 {
252   \erw_cs_set_inline:Nn \__erw_map:n {#1}
253   \erw_map:n{#2}
254 }

255 \cs_set:Npn \erw_merge:nn #1 #2
256 {
257   {#1#2}
258 }

259 \cs_set:Npn \erw_repeat:nn #1 #2
260 {
261   \int_step_inline:nnnn{1}{1}{#1}{#2}
262 }

263 \cs_set:Npn \erw_split:nnn #1 #2 #3
264 {
265   \tl_head:n{#1}
266   \use:c{exp_args:#3} \tl_map_inline:nn
267   {

```

```

268     \tl_tail:n
269     {
270         #1
271     }
272     }{#2##1}
273 }

274 \cs_set:Npn \erw_split:nn #1 #2
275 {
276     \erw_split:nnn{#1}{#2}{Nf}
277 }

278 \cs_set:Npn \__erw_map_thread_at:Nnn #1 #2 #3
279 {
280     \erw_cs_apply:Nn #1
281     {\exp_args:Nf\tl_item:nn {#3} {#2} }
282 }

283 \cs_set:Npn \__erw_map_thread_at:Nnnn #1 #2 #3 #4
284 {
285     \erw_cs_apply:Nnn #1
286     {\exp_args:Nf\tl_item:nn {#3} {#2} }
287     {\exp_args:Nf\tl_item:nn {#4} {#2} }
288 }

289 \cs_set:Npn \__erw_map_thread_at:Nnnnn #1 #2 #3 #4 #5
290 {
291     \erw_cs_apply:Nnnn #1
292     {\exp_args:Nf\tl_item:nn {#3} {#2} }
293     {\exp_args:Nf\tl_item:nn {#4} {#2} }
294     {\exp_args:Nf\tl_item:nn {#5} {#2} }
295 }

296 \cs_set:Npn \__erw_map_thread_at:Nnnnnn #1 #2 #3 #4 #5 #6
297 {
298     \erw_cs_apply:Nnnnn #1
299     {\exp_args:Nf\tl_item:nn {#3} {#2} }
300     {\exp_args:Nf\tl_item:nn {#4} {#2} }
301     {\exp_args:Nf\tl_item:nn {#5} {#2} }
302     {\exp_args:Nf\tl_item:nn {#6} {#2} }
303 }

304 \cs_set:Npn \erw_map_thread_at:Nnn #1 #2 #3
305 {
306     \exp_args:Nf\int_case:nnTF
307     {
308         \tl_count:n{#3}
309     }
310     {
311         {1}{ \__erw_map_thread_at:Nnn #1{#2}#3 }
312         {2}{ \__erw_map_thread_at:Nnnn #1{#2}#3 }
313         {3}{ \__erw_map_thread_at:Nnnnn #1{#2}#3 }
314         {4}{ \__erw_map_thread_at:Nnnnnn #1{#2}#3 }
315     }
316     {
317         % Do nothing
318     }
319     {

```

```

320     \msg_error:nnn{erw}
321     {generic}
322     {erw_map_thread_at:~count~of~#3~not~withing~1~to~4}
323   }
324 }

325 \cs_set:Npn \erw_map_thread:Nn #1 #2
326 {
327   % TODO check that #2 is a matrix
328   \int_step_inline:nn
329   {
330     \exp_args:Nf \tl_count:n{ \tl_head:n{#2} }
331   }
332   {
333     \erw_map_thread_at:Nnn #1 {##1} {#2}
334   }
335 }

```

7 numbrdcs

```

336 \int_new:N \g__erw_cs_no_int
337 \cs_set:Npn \erw_cs_no_name:n #1{__erw_cs_no_\int_to_alph:n{#1}:n}
338 \cs_set:Npn \erw_cs_no_name_braced:n #1{{\erw_cs_no_name:n{#1}}}
339 \tl_set:Nn \g__erw_cs_no_name_tl {\erw_cs_no_name:n{\g__erw_cs_no_int}}
340 \cs_set:Npn \erw_cs_no:nn #1 #2
341 {
342   \erw_cs_apply:cn{__erw_cs_no_\int_to_alph:n{#1}:n}{#2}
343 }

344 \cs_new_protected:Npn \erw_cs_no_reset:
345 {
346   \int_zero:N \g__erw_cs_no_int
347   \tl_set:Nn \__erw_cs_no_ext_tl{}%^A remove
348 }

349 \cs_new_protected:Npn \erw_cs_no_new:n #1
350 {
351   \int_incr:N \g__erw_cs_no_int
352   \erw_cs_set_inline:cn{\g__erw_cs_no_name_tl}
353   {
354     \token_if_cs:NTF
355     {#1}
356     {#1{##1}}
357     {#1}
358   }
359 }

360 \cs_new:Npn \erw_cs_no_names:nnn #1 #2 #3
361 {
362   \int_step_function:nnnN { #1 }{ #2 }{ #3 } \erw_cs_no_name:n
363 }

364 \cs_new:Npn \erw_cs_no_names_braced:nnn #1 #2 #3
365 {
366   \int_step_function:nnnN { #1 }{ #2 }{ #3 } \erw_cs_no_name_braced:n
367   % TODO \tl_range_braced:nnn?

```



```

368 }
369 \cs_new:Npn \erw_cs_no_names_braced:
370 {
371   \erw_cs_no_names_braced:nnn{1}{1}{\g__erw_cs_no_int}
372 }

```

8 option

```

373 \keys_define:nn{__erw}
374 {
375   fold/set_par. tl_set:N = \g__erw_fold_set_par_tl,
376   fold/set_par. value_required:n = true,
377   fold/set_par. default:n = Nf,
378   fold/set_par. initial:n = Nf,
379   fold/apply_par. tl_set:N = \g__erw_fold_apply_par_tl,
380   fold/apply_par. value_required:n = true,
381   fold/apply_par. default:n = Nf,
382   fold/apply_par. initial:n = Nf
383 }

```

9 Closing

```

384 %      ^^A \ProcessKeysPackageOptions{ erw }
385 \ExplSyntaxOff

```