l3erw-compose*

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Abstract

LaTeX3 package to compose control sequences (think $g \circ f$) whether predefined or inline.

1 Usage

`\erw_compose:nV` `\erw_compose:nV{⟨cs list⟩}⟨var⟩`
`\erw_compose:nn`
See Listing 2

`\erw_compose_c:nV` `\erw_compose_c:nV{⟨cs names⟩}⟨var⟩`
`\erw_compose_c:nn`
See Listing 3

`\erw_compose_seq:nV` `\erw_compose:nV{⟨cs list⟩}⟨seq⟩`
See Listing 4

`\erw_compose_seq_c:nV` `\erw_compose_c:nV{⟨cs names⟩}⟨seq⟩`
See Listing 5

`\erw_compose_vers:nV` `\erw_compose_vers:nV{⟨list of cs or code⟩}⟨var⟩`
`\erw_compose_vers:nn`
See Listing 6. Only the `nn` version is implemented

`\erw_compose_seq_vers:nV` `\erw_compose_seq_vers:nV{⟨list of cs or code⟩}⟨seq⟩`
`\erw_compose_seq_vers:nn`
Not implemented.

Listing 1 Initialization

```
\cs_set:Npn \__foo #1 {f(#1)}
\cs_set:Npn \__bar #1 {g[#1]}
\cs_set:Npn\__baz #1 {h\{#1\}}
```

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Listing 2

```
\tl_set:Nn \l_tmpa_tl{X}
\erw_compose:nV{
  {\__foo}{\__bar}{\__baz}}
  \l_tmpa_tl
\l_tmpa_tl                          h{g[f(X)]}
\tl_set:Nn \l_tmpa_tl{X}
\erw_compose:nn{
  {\__foo}{\__bar}{\__baz}}
  {X}                               h{g[f(X)]}
```

Listing 3

```
\tl_set:Nn \l_tmpa_tl{X}
\erw_compose_c:nV{
  {__foo}{__bar}{__baz}}
  \l_tmpa_tl
\l_tmpa_tl                          h{g[f(X)]}
\erw_compose_c:nn{
  {__foo}{__bar}{__baz}}
  {X}                               h{g[f(X)]}
```

Listing 4

```
\seq_new:N\l_tmp_seq
\seq_put_right:Nn\l_tmp_seq{X}
  \l_tmp_seq
\seq_item:Nn\l_tmp_seq{1}           X
\seq_item:Nn\l_tmp_seq{2}           f(X)
\seq_item:Nn\l_tmp_seq{3}           g[f(X)]
\seq_item:Nn\l_tmp_seq{4}           h{g[f(X)]}
```

Listing 5

```
\seq_new:N\l_tmp_seq
\seq_put_right:Nn\l_tmp_seq{X}
\erw_compose_seq_c:nV{
  {__foo}{__bar}{__baz}}
  \l_tmp_seq
\seq_item:Nn\l_tmp_seq{1}           X
\seq_item:Nn\l_tmp_seq{2}           f(X)
\seq_item:Nn\l_tmp_seq{3}           g[f(X)]
\seq_item:Nn\l_tmp_seq{4}           h{g[f(X)]}
```

Listing 6

```
\erw_compose_vers:nn{
  {\__foo}{g[#1]}{\__baz}}
  {X}                               h{g[f(X)]}
```

2 History

It's `\erw_compose_versatile` that was problematic. Refer to Section 'History' of l3erw-numbrdcs on which it is built. The use of `\exp_last_unbraced:Nx` originated in [2]

3 Implementation

```
\ExplSyntaxOn
\NeedsTeXFormat{LaTeX2e}
\RequirePackage{expl3}[2018/02/21]
\RequirePackage{l3erw-csutil}[2018/05/20]
\RequirePackage{l3erw-numbrdcs}[2018/05/20]
\msg_new:nnn{erw_compose}{generic}{#1}
\cs_set:Npn \erw_compose:NnV
  #1 % method
  #2 % funs
  #3 % var
{
  \erw_fold_set_par:n{Nf}
  \erw_fold_apply_par:n{Nf}
  \erw_cs_set_inline:Nn \__erw_map:n
  {
     #1{##1}#3
  }
  \erw_map:n{#2}
}
\cs_set:Npn \erw_compose:nV #1 #2
{
  \erw_compose:NnV \erw_fold:NV {#1} #2
}
\cs_set:Npn \erw_compose_c:nV #1 #2
{
  \erw_compose:NnV \erw_fold:cV {#1} #2
}
\tl_new:N \__erw_compose_tl
\cs_set:Npn \erw_compose:nn #1 #2
{
  \tl_set:Nn \__erw_compose_tl {#2}
  \erw_compose:nV{#1}\__erw_compose_tl
  \__erw_compose_tl
}
\cs_set:Npn \erw_compose_c:nn #1 #2
{
  \tl_set:Nn \__erw_compose_tl {#2}
  \erw_compose_c:nV{#1}\__erw_compose_tl
  \__erw_compose_tl
}
\tl_new:N \__erw_fold_seq_item_tl
\cs_set:Npn \erw_fold_seq:NV
  #1 % fun
  #2 % seq
{
  \seq_get_right:NN #2 \__erw_fold_seq_item_tl
```

```
  \erw_fold:NV #1 \__erw_fold_seq_item_tl
  \seq_put_right:No #2 {\__erw_fold_seq_item_tl}
}
\cs_generate_variant:Nn \erw_fold_seq:NV {cV}
\cs_set:Npn \erw_compose_seq:nV #1 #2
{
  \erw_compose:NnV \erw_fold_seq:NV {#1} #2
}
\cs_set:Npn \erw_compose_seq_c:nV
  #1 % funs
  #2 % seq
{
  \erw_compose:NnV \erw_fold_seq:cV {#1} #2
}
\cs_set:Npn \erw_compose_vers:nV #1 #2
{
   \msg_error:nnn{erw_rec}{generic}{erw_compose_vers:nV~to~be~defined}
}
\cs_set:Npn \erw_compose_seq_vers:nV #1 #2
{
   \msg_error:nnn{erw_rec}{generic}{erw_compose_seq_vers:nV~to~be~defined}
}
\cs_set:Npn \erw_compose_vers:nn #1 #2
{
   \erw_numbrd_cs_reset:{}
      \tl_map_function:nN{#1}\erw_numbrd_cs_new:n
      \exp_last_unbraced:Nx
      \erw_compose_c:nn
         {{\erw_numbrd_cs_names_braced:{}}}
         {#2}
}
\ExplSyntaxOff
```

References

[1] The LaTeX3 Project Team *l3packages* http://mirror.ctan.org/macros/latex/contrib/l3packages/

[2] https://tex.stackexchange.com/questions/432171/expl3-making-arguments-from-a-loop