# The codedescribe and codelisting Packages Version 1.10

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#### Abstract

This package is designed to be as class independent as possible, depending only on expl3, scontents, listing and pifont. Unlike other packages of the kind, a minimal set of macros/commands/environments is defined: most/all defined commands have an "object type" as a keyval parameter, allowing for an easy expansion mechanism (instead of the usual "one set of macros/environments" for each object type).

No assumption is made about page layout (besides "having a marginpar"), or underlying macros, so that it can be used with any document class.

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### 1 Introduction

This package aims to document both Document level (i.e. final user) commands, as well Package/Class level commands. It's fully implemented using expl3 syntax and structures, in special 13coffins, 13seq and 13keys. Besides those scontents and listing packages (see [1] and [2]) are used to typeset code snippets. The package pifont is needed just to typeset those (open)stars, in case one wants to mark a command as (restricted) expandable.

No other package/class is needed, any class can be used as the base one, which allows to demonstrate the documented commands with any desired layout.

codelisting defines a few macros to display and demonstrate LATEX code (using listings and scontents), whilst codedescribe defines a series of macros to display/enumerate macros and environments (somewhat resembling the doc3 style).

<sup>\*</sup>https://github.com/alceu-frigeri/codedescribe

### 1.1 Single versus Multi-column Classes

This package "can" be used with multi-column classes, given that the \linewidth and \columnsep are defined appropriately. \linewidth shall defaults to text/column real width, whilst \columnsep, if needed (2 or more columns) shall be greater than \marginparwidth plus \marginparsep.

#### 1.2 Current Version

This doc regards to *codedescribe* version 1.10 and *codelisting* version 1.10. Those two packages are fairly stable, and given the <code>obj-type</code> mechanism (see 3.2) they can be easily extended without changing their interface.

# 2 codelisting Package

It requires two packages: listings and scontents, defines an environment: codestore, commands for listing/demo code: \tscode, \tsmergedcode, \tsdemo, \tsresult and \tsexec and 2 auxiliary commands: \setcodekeys and \setnewcodekey.

### 2.1 In Memory Code Storage

Thanks to scontents (expl3 based) it's possible to store LATEX code snippets in a expl3 sequence variable.

codestore

```
\label{local_local_local_local} $$ \left[ \left\langle \text{stcontents-keys} \right\rangle \right] \\ \left( \text{codestore} \right) $$
```

This environment is an alias to scontents environment (from scontents package, see [1]), all scontents keys are valid, with two additional ones: st and store-at which are aliases to the store-env key. If an "isolated" (st-name) is given (unknown key), it is assumed that the environment body shall be stored in it (for use with \tscode, \tsmergedcode, \tsdemo, \tsresult and \tsexec).

**Note:** From scontents,  $\langle \text{st-name} \rangle$   $\langle \text{index} \rangle \text{ed}$  (The code is stored in a sequence variable). It is possible to store as many code snippets as needed under the same name. The first one will be  $\langle \text{index} \rangle \rightarrow 1$ , the second 2, and so on.

### 2.2 Code Display/Demo

\tscode\*
\tsdemo\*
\tsresult\*

```
\tscode* [\( \code-\text{keys} \)] {\( \st-name \)} [\( \cindex \)]
\tsdemo* [\( \code-\text{keys} \)] {\( \st-name \)} [\( \cindex \)]
\tsresult* [\( \code-\text{keys} \)] {\( \st-name \)} [\( \cindex \)]
```

updated: 2024/01/06 updated: 2025/04/29 \tscode\* just typesets \( \st-name \) (created with codestore), in verbatim mode and syntax highlight (from listings package [2]). The non-star version centers it and use just half of the base line. The star version uses the full text width.

\tsdemo\* first typesets \( \st-name \), as above, then executes it. The non-start version place them side-by-side, whilst the star version places one following the other.

(new 2024/01/06) \tsresult\* only executes it. The non-start version centers it and use just half of the base line, whilst the star version uses the full text width.

only *executes* it. The non-start version centers it and use just half of the base line, whilst the star version uses the full text width.

**Note:** (from stcontents package)  $\langle index \rangle$  can be from 1 up to the number of stored codes under the same  $\langle st-name \rangle$ . Defaults to 1.

**Note:** All are executed in a local group which is discarded at the end. This is to avoid unwanted side effects, but might disrupt code execution that, for instance, depends on local variables being set. That for, see \tsexec below.

For Example:

### $\LaTeX$ Code:

```
\begin{codestore} [stmeta]
    Some \LaTeX^coding, for example: \ldots.
\end{codestore}
This will just typesets \tsobj[key]{stmeta}:
\tscode*[codeprefix={Sample Code:}] {stmeta}
and this will demonstrate it, side by side with source code:
\tsdemo[numbers=left,ruleht=0.5,
    codeprefix={inner sample code},
    resultprefix={inner sample result}] {stmeta}
```

#### LATEX Result:

This will just typesets stmeta:

#### Sample Code:

```
Some \LaTeX~coding, for example: \ldots.
```

and this will demonstrate it, side by side with source code:

inner sample code

inner sample result

Some \LaTeX~coding, for example: \ldots.

Some LATEX coding, for example: ....

\tsmergedcode\*

\tsmergedcode\* [\langle code-keys \rangle] {\langle st-name-index list \rangle}

new: 2025/04/29

This will typeset (as \tscode) the merged contents from  $\langle st-name-index list \rangle$ . The list syntax comes from scontents (command \mergesc), where it is possible to refer to a single index  $\{\langle st-name A \rangle\}$  [ $\langle index \rangle$ ], a index range  $\{\langle st-name B \rangle\}$  [ $\langle index A-index B \rangle$ ], or all indexes from a  $\langle st-name \rangle$ ,  $\{\langle st-name C \rangle\}$  [ $\langle 1-end \rangle$ ]. The special index  $\langle 1-end \rangle$  refers to all indexes stored under a given  $\langle st-name \rangle$ .

**Note:** The brackets aren't optional. For instance \tsmergedcode\* [ $\langle code-keys \rangle$ ] {  $\{\langle st-name\ A \rangle\}\ [\langle index \rangle]\ ,\ \{\langle st-name\ B \rangle\}\ [\langle index A-index B \rangle]\ ,\ \{\langle st-name\ C \rangle\}\ [\langle 1-end \rangle]\ \}$ 

\tsexec

 $\verb|\tsexec|| \{ \langle \texttt{st-name} \rangle \} \ [ \langle \texttt{index} \rangle ]$ 

new: 2025/04/29

Unlike the previous commands which are all executed in a local group (discarded at the end) this will execute the code stored at  $\langle st-name \rangle [\langle index \rangle]$  in the current LATEX group.

### 2.2.1 Code Keys

\setcodekeys

\setcodekeys  $\{\langle code-keys \rangle\}$ 

One has the option to set (code-keys) per \tscode, \tsmergedcode, \tsdemo and \tsresult call (see 2.2), or globally, better said, in the called context group.

N.B.: All \tscode and \tsdemo commands create a local group in which the \( \)code-keys\( \) are defined, and discarded once said local group is closed. \( \)setcodekeys defines those keys in the \( \)current context/group.

\setnewcodekey

\setnewcodekey  $\{\langle new-key \rangle\} \{\langle code-keys \rangle\}$ 

new: 2025-05-01

This will define a new key  $\langle new-key \rangle$ , which can be used with \tscode, \tsmergedcode, \tsdemo and \tsresult.  $\langle code-keys \rangle$  can be any of the following ones, including other  $\langle new-key \rangle$ s. Be careful not to create a definition loop.

settexcs

settexcs, settexcs2, settexcs3 and settexcs4

texcs

texcs, texcs2, texcs3 and texcs4

texcsstyle

texcsstyle, texcs2style, texcs3style and texcs4style

2025-05-01 updated:

Those define sets of LATEX commands (csnames), the set variants initialize/redefine those sets (an empty list, clears the set), while the others extend those sets. The style ones redefines the command display style (an empty \( \nabla \) alue \( \nabla \) resets the style to it's default).

setkeywd

setkeywd, setkeywd2, setkeywd3 and setkeywd4

keywd

keywd, keywd2, keywd3 and keywd4

keywdstyle

keywdstyle, keywd2style, keywd3style and keywd4style

updated: 2025-05-01 Same for other *keywords* sets.

setemph emph

setemph, setemph2, setemph3 and setemph4

emph, emph2, emph3 and emph4

emphstyle

emphstyle, emph2style, emph3style and emph4style

updated: 2025-05-01 for some extra emphasis sets.

letter other

letter and other

2025-05-13

These allow to redefine what a letter or other are (they correspond to the alsoletter and alsoother keys from listings). The default value for the letter includes (sans the comma) : \_ , whilst other default value is an empty list.

> **Note:** You might want to consider setting letter to just letter={0,\_} so you don't have to list all variants, but just the base name of a function.

numbers

numbers and numberstyle

numberstyle

numbers possible values are none (default) and left (to add tinny numbers to the left of the listing). With numberstyle one can redefine the numbering style.

stringstyle stringstyle and commentstyle

codestyle

to redefine strings and comments formatting style.

bckgndcolor

bckgndcolor

to change the listing background's color.

codeprefix

codeprefix and resultprefix

resultprefix

those set the codeprefix (default: IATEX Code:) and resultprefix (default: IATEX Result:)

parindent

parindent

Sets the indentation to be used when 'demonstrating' LATEX code (\tsdemo). Defaults to whatever value \parindent was when the package was first loaded.

ruleht

ruleht

When typesetting the 'code demo' (\tsdemo) a set of rules are drawn. The Default, 1, equals to \arrayrulewidth (usually 0.4pt).

basicstyle

basicstyle

new: 2023/11/18 Sets the base font style used when typesetting the 'code demo', default being \footnotesize \ttfamily

# 3 codedescribe Package

This package aims at minimizing the number of commands, with object kind (if a macro, or a function, or environment, or variable, or key ...) as a parameter, allowing for a simple extension mechanism: other object types can be easily introduced without having to change, or add commands.

### 3.1 Package Options

nolisting it will suppress the *codelisting* package load. In case it isn't needed or another listing package will be used.

base skip Changes the base skip, all skips (used by the environments at 3.3) are scaled from this. It defaults to font size at load time.

### 3.2 Object Type keys

⟨obj-types⟩ defines the applied format, which is defined in terms of ⟨format-groups⟩ wich defines a formatting function, font shape, bracketing, etc. to be applied.

#### 3.2.1 Format Keys

Those are the primitive  $\langle format-keys \rangle$  used when (re)defining  $\langle format-groups \rangle$  and  $\langle obj-types \rangle$  (see 3.2.4):

meta to typeset between angles,

xmeta to typeset \*verbatim\* between angles,

verb to typeset \*verbatim\*,

xverb to typeset \*verbatim\*, suppressing all spaces,

to typeset \*verbatim\*, suppressing all spaces and replacing a TF by <u>TF</u>,

nofmt in case of a redefinition, to remove the 'base' formatting,

slshape to use a slanted font shape, itshape to use an italic font shape,

noshape in case of a redefinition, to remove the 'base' shape,

1bracket defines the left bracket (when using \tsargs). Note: this key must have an

associated value,

rbracket defines the right bracket (when using \tsargs). Note: this key must have an

associated value,

color defines the text color. **Note:** this key must have an associated value (a color,

as understood by xcolor package).

#### 3.2.2 Format Groups

Using \defgroupfmt (see 3.2.4) one can (re)define custom \( format-groups \). The following ones are pre-defined:

meta which sets meta and color

verb which sets color

oarg which sets meta and color code which sets code and color

syntax which sets color

keyval which sets slshape and color

option which sets color defaultval which sets color

env which sets slshape and color pkg which sets slshape and color

**Note:** color was used in the list above just as a 'reminder' that a color is defined/associated with the given group, it can be changed with \defgroupfmt.

### 3.2.3 Object Types

Object types are the \keys\ used with \tsobj (and friends, see 3.4) defining the specific formatting to be used. With \defobjectfmt (see 3.2.4) one can (re-)define custom \langle obj-types\. The predefined ones are:

```
based on (group) meta
             arg, meta
                           based on (group) verb plus verb or xverb
             verb, xverb
                           based on (group) meta plus brackets
             marg
         oarg, parg, xarg based on (group) oarg plus brackets
    code, macro, function based on (group) code
                           based on (group) syntax
             syntax
keyval, key, keys, values based on (group) keyval
                           based on (group) option
             option
                           based on (group) defaultval
             defaultval
             env
                           based on (group) env
                           based on (group) pkg
             pkg, pack
```

### 3.2.4 Customization

To create user defined groups/objects or change the pre-defined ones:

```
\verb|\defgroupfmt| \{\langle \texttt{format-group} \rangle\} \{\langle \texttt{format-keys} \rangle\}
```

(format-group) is the name of the new group (or one being redefined, which can be one of the standard ones). (format-keys) is any combination of the keys from 3.2.1

For example, one can redefine the code group standard color with \defgroupfmt{code}{color=red} and all obj-types based on it will be typeset in red (in the standard case: code, macro and function objects).

```
\defobjectfmt
new: 2023/05/16
```

```
\verb|\defobjectfmt| \{\langle \texttt{obj-type} \rangle\} \{\langle \texttt{format-group} \rangle\} \{\langle \texttt{format-keys} \rangle\}
```

⟨obj-type⟩ is the name of the new ⟨object⟩ being defined (or redefined), ⟨format-group⟩ is the base group to be used (see 3.2.2). ⟨format-keys⟩ (see 3.2.1) allow for further differentiation.

For instance, the many optional  $\langle *arg \rangle$  are defined as follow:

```
\colorlet {c_codedesc_oarg_color} { gray!90!black }
\defgroupfmt {oarg} { meta , color=c_codedesc_oarg_color }
\defobjectfmt {oarg} {oarg} { lbracket={[] , rbracket={]] } }
\defobjectfmt {parg} {oarg} { lbracket={(] , rbracket={)} }
\defobjectfmt {xarg} {oarg} { lbracket={<} , rbracket={>} }
```

#### 3.3 Environments

codedescribe

new: 2023/05/01 updated: 2023/05/01 updated: 2024/02/16 NB: a note example

```
\verb|\begin{codedescribe}| [\langle \texttt{obj-keys} \rangle] {\langle \texttt{csv-list} \rangle}|
```

٠...

#### \end{codedescribe}

This is the main environment to describe Commands, Variables, Environments, etc. (csv-list) items will be listed in the left margin. The optional (obj-keys) defaults to just code, it can be any object type as defined at 3.2.3 (and 3.2.4), besides the following keys:

new To add a new line.

update To add an updated line.

note To add a NB line.

rulecolor For instance \begin{codedescribe}[rulecolor=white] will suppress the rules.

EXP A star  $\star$  will be added to all items, signaling the commands are fully expand-

able.

rEXP A hollow star  $\Leftrightarrow$  will be added to all items, signaling the commands are

restricted expandable.

Note: The keys new, update and note can be used multiple times. (2024/02/16)

codesyntax

#### \begin{codesyntax}

. . .

#### \end{codesyntax}

The codesyntax environment sets the fontsize and activates \obeylines, \obeyspaces, so one can list macros/cmds/keys use, one per line.

**Note:** codesyntax environment shall appear only once, inside of a codedescribe environment. An error will be raised if called outside. Take note, as well, this is not a verbatim environment!

For example, the code for codedescribe (previous entry) is:

 $\LaTeX$  Code:

describelist
describelist\*

\end{describelist}

This sets a description like 'list'. In the non-star version the (items-name) will be typeset on the marginpar. In the star version, (item-description) will be indented by (item-indent) (defaults to: 20mm). (obj-type) defines the object-type format used to typeset (item-name).

\describe

```
\describe \{\langle item-name \rangle\} \{\langle item-description \rangle\}
```

This is the describelist companion macro. In case of the describe\*, (item-name) will be typeset in a box (item-ident) wide, so that (item-description) will be fully indented, otherwise (item-name) will be typed in the marginpar.

Note: An error will be raised if called outside of a describelist or describelist\* environment.

### 3.4 Typeset Commands

Note that, in the following commands,  $\langle obj-type \rangle$  refers to any object type defined in 3.2.3 and 3.2.4.

\typesetobj \tsobj \typesetobj [\langle obj-type \rangle] {\langle csv-list \rangle \}
\tsobj [\langle obj-type \rangle] {\langle csv-list \rangle \rangle}

updated: 2025/05/29

This is the main typesetting command, each term of <code>(csv-list)</code> will be separated by a comma and formatted as defined by <code>(obj-type)</code> (defaults to <code>code)</code>. <code>(obj-type)</code> can be any object from 3.2.3 (or 3.2.4) and the following keys:

mid sep To change the item separator. Defaults to a comma, can be anything.

sep To change the separator between the last two items. Defaults to "and".

comma To set the separator between the last two items to a comma.

bnf or To produce a bnf style or list, like [abc|xdh|htf|hrf].

 $\label{eq:meta_def} \mbox{meta or} \qquad \mbox{To produce a bnf style or list between angles, like $$\langle abc|xdh|htf|hrf$\rangle$.}$ 

par or To produce a bnf style or list between parentheses, like (abc|xdh|htf|hrf).

\typesetargs \tsargs

These will typeset  $\langle csv-list \rangle$  as a list of parameters, like  $[\langle arg1 \rangle] [\langle arg2 \rangle] [\langle arg3 \rangle]$ , or  $\{\langle arg1 \rangle\} \{\langle arg2 \rangle\} \{\langle arg3 \rangle\}$ , etc.  $\langle obj-type \rangle$  defines the formating AND kind of brackets used (see 3.2): [] for optional arguments (oarg), {} for mandatory arguments (marg), and so on.

\typesetmacro \tsmacro

 $\label{typesetmacro} $$ \operatorname{{\bf acro-list}} [\langle \operatorname{acrs-list} \rangle] {\langle \operatorname{margs-list} \rangle} \times (\operatorname{{\bf acro-list}}) [\langle \operatorname{acrs-list} \rangle] {\langle \operatorname{margs-list} \rangle}$ 

These are just a short-cut for

\tsobj[code]{macro-list} \tsargs[oarg]{oargs-list} \tsargs[marg]{margs-list}.

\typesetmeta \tsmeta

 $\typesetmeta \{\langle name \rangle\} \\ \tsmeta \{\langle name \rangle\}$ 

These will just typeset (name) between left/right 'angles' (no other formatting).

\typesetverb \tsverb

\typesetverb [\langle obj-type \rangle] {\langle verbatim text \rangle }
\tsverb [\langle obj-type \rangle] {\langle verbatim text \rangle }

Typesets (verbatim text) as is (verbatim...). (obj-type) defines the used format. The difference with \tsobj [verb]{something} is that (verbatim text) can contain commas (which, otherwise, would be interpreted as a list separator in \tsobj.

**Note:** This is meant for short expressions, and not multi-line, complex code (one is better of, then, using 2.2). (verbatim text) must be balanced! otherwise, some low level TFX errors may pop out.

### 3.5 Note/Remark Commands

\typesetmarginnote \tsmarginnote

 $\label{typesetmarginnote} $$ \operatorname{{note}} $$ \operatorname{{note}} $$ \operatorname{{note}} $$$ 

Typesets a small note at the margin.

tsremark

```
\begin{tsremark} \ [\langle \mathtt{NB} \rangle] \\ \end{tsremark}
```

The environment body will be typeset as a text note.  $\langle NB \rangle$  (defaults to Note:) is the note begin (in boldface). For instance:

LATEX Code:

LATEX Result:

```
Sample text. Sample test.
\begin{tsremark}[N.B.]
This is an example.
\end{tsremark}
```

Sample text. Sample test.

**N.B.** This is an example.

### 3.6 Auxiliary Commands and Environment

In case the Document Class being used redefines the \maketitle command and/or abstract environment, alternatives are provided (based on the article class).

\typesettitle \tstitle

```
\label{typesettitle} $$ \text{title-keys}$ $$ \text{tstitle } {\langle \text{title-keys}\rangle }$
```

This is based on the \maketitle from the article class. The \( \title-keys \) are:

title The title.

author Author's name. It's possible to use the \footnote command in it.

date Title's date.

tsabstract

\begin{tsabstract}

. . .

\end{tsabstract}

This is the abstract environment from the article class.

\typesetdate \tsdate \typesetdate \tsdate

new: 2023/05/16

This provides the current date (Month Year, format).

## References

- [1] Pablo González. SCONTENTS Stores LaTeX Contents. 2024, p. 48. URL: http://mirrors.ctan.org/macros/latex/contrib/scontents/scontents.pdf (visited on 03/10/2025).
- [2] Jobst Hoffmann. The Listings Package. 2024, p. 65. URL: http://mirrors.ctan.org/macros/latex/contrib/listings/listings.pdf (visited on 03/10/2025).