The didec package

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https://www.ctan.org/pkg/didec

https://github.com/T-F-S/didec

Abstract

The `didec` package supports fixed-point arithmetic with two decimal places (*didecimal*) which is typical for financial transactions in many currencies. The intended use case is (personal) bookkeeping.

Contents

1 Quick start 2

2 Didec kernels and didec expressions 4

3 Creating didec variables 7

4 Setting didec variables 7

5 Using didecs 11

6 Didec conditionals 16

7 Viewing didecs 18

Index 19

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1 Quick start

For the impatient: this package provides fixed-point arithmetic with two decimal places. You may use it for any purpose where exactly two decimal places are needed or suffice, but the main application case is (personal) bookkeeping.

Say, John wants to keep track about his money. With

```
\didecnew{John}
```

a so-called *didec variable* is created to store currency values.

Now, lets fill in some money:

```
\didecset{John}{1000}
```

How much money has John now?

```
\didecuse{John}
```

1.000,00 €

Obviously, John has Euros and the amount is displayed in a German style manor. Of course, this can be adapted to your liking, see \didecsetup → P. 13. But now, let us spend some money.

```
\didecsub{John}{19.75}
\didecuse{John}
```

980,25 €

Preferably, the package functions are used inside convenient user commands. You can choose between LaTeX2e and LaTeX3 programming layer functions.

For this quick start, we make some convenience commands for John. `\transaction` shall be one purchase made in cash and `\transaction*` one made by credit card.

```
%\usepackage{booktabs}
\didecsetup{english,
  currency          = {\pounds}{},
  currency-negative = {-\pounds}{},
}

%\didecnew{John}
\didecnew{cash}
\didecnew{credit}
\didecnew{transaction}

% Let's keep record in a table
\NewDocumentEnvironment{householdbook}{}{%
    \begin{center}
    \begin{tabular}{lp{9cm}rr}\toprule%
    & Transaction & Expenses & Budget\\\midrule
  }{%
    \midrule%
    \multicolumn{3}{r}{Cash} & \dideccoluse{cash}\\%
    \multicolumn{3}{r}{Credit card} & \dideccoluse{credit}\\\bottomrule%
    \end{tabular}%
    \end{center}
```

```
  }

% One transaction
\NewDocumentCommand \transaction{ s m m }
  {
    \didecset{transaction}{#3}%
    \didecsub{John}{transaction}%
    \IfBooleanTF {#1}%
      {\didecsub{credit}{transaction}CC}%
      {\didecsub{cash}{transaction}}%
    & #2
    & \dideccolinvuse{transaction}
    & \dideccoluse{John}\\%
  }

% Ready to start our tiny accountancy

\didecset{John}{1000}         % John's money
\didecsetequal{cash}{John}    % in cash
\didecset{credit}{0}          % blank credit card

\begin{householdbook}
  \transaction{Coffee break with snack}{19.75}
  \transaction*{Refuel}{62.87}
  \transaction{Gift from Aunt Mary for helping her}{-30}
  \transaction{Parking meter}{4.50}
  \transaction*{Shopping for weekend}{147.23}
  \transaction*{Fancy thing on the Internet}{270}
  \transaction*{Cinema}{17.70}
\end{householdbook}
```

	Transaction	Expenses	Budget
	Coffee break with snack	£19.75	£980.25
CC	Refuel	£62.87	£917.38
	Gift from Aunt Mary for helping her	-£30.00	£947.38
	Parking meter	£4.50	£942.88
CC	Shopping for weekend	£147.23	£795.65
CC	Fancy thing on the Internet	£270.00	£525.65
CC	Cinema	£17.70	£507.95
		Cash	£1,005.75
		Credit card	-£497.80

2 Didec kernels and didec expressions

All calculations are done on cent basis as integer operations, but all displayed figures have two decimal places which give the name for the package (*di-dec*imal).

The package provides two numerical kernels which can be selected mutually by package options `didec/int` or `didec/fp`. The `didec/int` kernel is faster, but provides a smaller number range, while the `didec/int` kernel is slower with a larger number range. For ordinary people like you and me, the `didec/int` kernel will suffice to do all personal financial calculations. Upgrading later from `didec/int` to `didec/fp` is a matter of just switching the package option setting.

didec/int (no value, initially set)

Selects the ⟨*int*⟩ (integer) based numerical kernel with up to 9.33[2] significant figures and fast computation. The number range for valid figures n is:

$$-21\,474\,836.47 \leq n \leq 21\,474\,836.47$$

```
\usepackage[int]{didec}
```

Using figures outside the valid range will result in LaTeX errors complaining about too large numbers.

didec/fp (no value, initially unset)

Selects the ⟨*fp*⟩ (floating-point) based numerical kernel with up to 16 significant figures and somewhat slower computation. The number range for valid figures n is:

$$-99\,999\,999\,999\,999.99 \leq n \leq 99\,999\,999\,999\,999.99$$

```
\usepackage[fp]{didec}
```

Using figures outside the valid range will result in *silent calculation errors*, because LaTeX3 ⟨*fp*⟩ can use much larger numbers but is restricted to 16 significant figures.

In the following, a ⟨*didec expr*⟩ (didec expression) denotes one of the following:

- a number in floating-point notation, e.g. `123.45`
- a number in floating-comma notation, e.g. `123,45`
- a ⟨*didec var*⟩ (didec variable), e.g. `expenses`.

Note that the notation ⟨*didec expr*⟩ is inspired by ⟨*int expr*⟩ and ⟨*fp expr*⟩ from LaTeX3 but is in comparison very restricted and allows only the three choices above. A ⟨*didec expr*⟩ is always expanded and spaces are trimmed.

Many provided commands or functions of the package come in three flavors, for example:

- `\didecadd` → P. 9: This is a user command where arguments are space trimmed and some check on variable existence is done. Not existing variables are reported by speaking error messages (not in all cases!).
- `\didec_gadd_check:nn` → P. 9: This a programming layer function with no space trimming for arguments, but some check on variable existence is done. Not existing variables are reported by speaking error messages (not in all cases!).
- `\didec_gadd:nn` → P. 9: This a programming layer function with no space trimming for arguments and no check on variable existence. Not existing variables give strange errors. This is the fasted function and base of the others above.

[2] joke for the mathematicians

The following tables compare the computation time for selected functions of the package for the two numerical kernels. Time values will differ on other computers and also depend on selected values for the examples calculations. Nevertheless, you get an impression of the differences.

kernel: `int`, engine: `pdftex`	
`\didec_gset:nn`	7 µs
`\didec_gset_check:nn`	10 µs
`\didecset`	18 µs
`\didec_gset_eq:nn`	1 µs
`\didec_gset_eq_check:nn`	6 µs
`\didecsetequal`	14 µs
`\didec_gset_fp:nn`	102 µs
`\didec_gset_fp_check:nn`	103 µs
`\didecsetfp`	115 µs
`\didec_gadd:nn`	6 µs
`\didec_gadd_check:nn`	8 µs
`\didecadd`	27 µs
`\didec_gadd_to:nnn`	11 µs
`\didec_gadd_to_check:nnn`	14 µs
`\didecadd`	50 µs
`\didec_gmul_fp:nn`	106 µs
`\didec_gmul_fp_check:nn`	111 µs
`\didecmulfp`	133 µs
`\didec_if_positive:nTF`	1 µs
`\didecifpositive`	6 µs
`\didec_compare:nNnTF`	9 µs
`\didecifgreaterthan`	16 µs
`\didec_to_fp:n`	13 µs
`\didec_to_fp_check:n`	15 µs
`\didectofp`	21 µs
`\didec_use:n`	14 µs
`\didec_use_check:n`	17 µs
`\didecuse`	36 µs
`\didecformat`	41 µs
`\didec_color_use:n`	58 µs
`\didec_color_use_check:n`	60 µs
`\dideccoluse`	81 µs
`\dideccolformat`	87 µs

kernel: `fp`, engine: `pdftex`	
`\didec_gset:nn`	36 µs
`\didec_gset_check:nn`	39 µs
`\didecset`	48 µs
`\didec_gset_eq:nn`	1 µs
`\didec_gset_eq_check:nn`	6 µs
`\didecsetequal`	14 µs
`\didec_gset_fp:nn`	120 µs
`\didec_gset_fp_check:nn`	123 µs
`\didecsetfp`	133 µs
`\didec_gadd:nn`	59 µs
`\didec_gadd_check:nn`	62 µs
`\didecadd`	83 µs
`\didec_gadd_to:nnn`	79 µs
`\didec_gadd_to_check:nnn`	82 µs
`\didecadd`	123 µs
`\didec_gmul_fp:nn`	148 µs
`\didec_gmul_fp_check:nn`	151 µs
`\didecmulfp`	174 µs
`\didec_if_positive:nTF`	15 µs
`\didecifpositive`	22 µs
`\didec_compare:nNnTF`	78 µs
`\didecifgreaterthan`	85 µs
`\didec_to_fp:n`	26 µs
`\didec_to_fp_check:n`	29 µs
`\didectofp`	35 µs
`\didec_use:n`	28 µs
`\didec_use_check:n`	30 µs
`\didecuse`	50 µs
`\didecformat`	91 µs
`\didec_color_use:n`	72 µs
`\didec_color_use_check:n`	74 µs
`\dideccoluse`	97 µs
`\dideccolformat`	139 µs

If needed, the selected kernel can be questioned by the following:

`\c_didec_kernel_str`

The current kernel given as a lower case string: one of `int` or `fp`.

```
\ExplSyntaxOn
\c_didec_kernel_str
\ExplSyntaxOff
```

```
int
```

`\didec_if_kernel_int_p:`
`\didec_if_kernel_int:T` {⟨*true code*⟩}
`\didec_if_kernel_int:TF` {⟨*true code*⟩}{⟨*false code*⟩}
`\didec_if_kernel_fp_p:`
`\didec_if_kernel_fp:T` {⟨*true code*⟩}
`\didec_if_kernel_fp:TF` {⟨*true code*⟩}{⟨*false code*⟩}

Conditionals which allow kernel-specific code to be used. The names follow naturally from those of the kernels.

```
\ExplSyntaxOn
\didec_if_kernel_int:T { Integer~kernel~used. }\par
Floating~point~kernel
\didec_if_kernel_fp:TF { ~used. }{ ~not~used. }
\ExplSyntaxOff
```

```
Integer kernel used.
Floating point kernel not used.
```

3 Creating didec variables

\didecnew{⟨didec var⟩}
\didec_new:n{⟨didec var⟩}

Creates a new ⟨didec var⟩ or raises an error if the name is already taken. \didecnew trims spaces while \didec_new:n does not.

```
\didecnew{konto}
\didecset{konto}{99.75}
\didecuse{konto}
```

99,75 €

4 Setting didec variables

\didecset{⟨didec var⟩}{⟨didec expr⟩}
\didec_gset:nn{⟨didec var⟩}{⟨didec expr⟩}
\didec_gset_check:nn{⟨didec var⟩}{⟨didec expr⟩}

Sets ⟨didec var⟩ to the value of ⟨didec expr⟩ which can be

- a number in floating-point notation,
- a number in floating-comma notation,
- another ⟨didec var⟩.

\didecset trims spaces and performs an existence check for ⟨didec var⟩. \didec_gset_check:nn performs an existence check for ⟨didec var⟩. Decimals places 3 and beyond are cut not rounded. If rounding is an issue, use \didecsetfp → P. 8 instead.

```
\didecset{A}{1234.56}
\didecuse{A}

\didecset{A}{2345,6789}
\didecuse{A}

\didecset{B}{-3500}
\didecset{A}{B}
\didecuse{A}
```

1.234,56 €
2.345,67 €
-3.500,00 €

\didecsetequal{⟨didec var$_1$⟩}{⟨didec var$_2$⟩}
\didec_gset_eq:nn{⟨didec var$_1$⟩}{⟨didec var$_2$⟩}
\didec_gset_eq_check:nn{⟨didec var$_1$⟩}{⟨didec var$_2$⟩}

Sets the ⟨didec var$_1$⟩ to the current value of ⟨didec var$_2$⟩

```
\didecset{A}{1234.56}
\didecsetequal{B}{A}
\didecuse{A}
\didecuse{B}
```

1.234,56 € 1.234,56 €

\didecsetnegative{⟨didec var⟩}{⟨didec expr⟩}
\didec_gset_negative:nn{⟨didec var⟩}{⟨didec expr⟩}
\didec_gset_negative_check:nn{⟨didec var⟩}{⟨didec expr⟩}

Sets ⟨didec var⟩ to the negated (opposite) value of ⟨didec expr⟩. \didecsetnegative trims spaces and performs an existence check for ⟨didec var⟩.

```
\didecsetnegative{A}{1234.56}
\didecuse{A}

\didecsetnegative{A}{-42.55}
\didecuse{A}

\didecset{B}{-3500}
\didecsetnegative{A}{B}
\didecuse{A}
```

-1.234,56 €
42,55 €
3.500,00 €

\didecsetfp{⟨didec var⟩}{⟨fp expr⟩}
\didec_gset_fp:nn{⟨didec var⟩}{⟨fp expr⟩}
\didec_gset_fp_check:nn{⟨didec var⟩}{⟨fp expr⟩}

Sets ⟨didec var⟩ to the value of ⟨fp expr⟩ which can by any LaTeX3 floating-point expression. \didecsetfp trims spaces and performs an existence check for ⟨didec var⟩. Other didec variables can be used inside ⟨fp expr⟩ if guarded with \didectofp → P. 11. The result is rounded to 2 decimal places. \didec_gset_fp_check:nn performs an existence check for ⟨didec var⟩.

```
\didecsetfp{A}{2345.6789}
\didecuse{A}

\didecsetfp{A}{ ln( 12345678 ) }
\didecuse{A}

\didecset{A}{123456,78}
\didecsetfp{B}{ \didectofp{A} * 2.35 / 100 }
2.35\% of \didecuse{A} are \didecuse{B}.
```

2.345,68 €
16,33 €
2.35% of 123.456,78 € are 2.901,23 €.

\didecadd[⟨didec var⟩]{⟨didec expr$_1$⟩}{⟨didec expr$_2$⟩}
\didec_gadd:nn{⟨didec var⟩}{⟨didec expr⟩}
\didec_gadd_check:nn{⟨didec var⟩}{⟨didec expr⟩}
\didec_gadd_to:nnn{⟨didec var⟩}{⟨didec expr$_1$⟩}{⟨didec expr$_2$⟩}
\didec_gadd_to_check:nnn{⟨didec var⟩}{⟨didec expr$_1$⟩}{⟨didec expr$_2$⟩}

- Adds the result of computing the ⟨didec expr⟩ to the ⟨didec var⟩
- or sets ⟨didec var⟩ to the sum of ⟨didec expr$_1$⟩ and ⟨didec expr$_2$⟩.
- For \didecadd, if the optional ⟨didec var⟩ is not available, the sum is stored into ⟨didec expr$_1$⟩ which has to be a ⟨didec var⟩ in this case.

```
\didecset{A}{123}
\didecset{B}{5,88}
\didecadd{A}{B}
\didecuse{A}

\didecadd[A]{B}{1000}
\didecuse{A}

\didecadd{A}{-2750}
\didecuse{A}
```

128,88 €
1.005,88 €
-1.744,12 €

\didecsub[⟨didec var⟩]{⟨didec expr$_1$⟩}{⟨didec expr$_2$⟩}
\didec_gsub:nn{⟨didec var⟩}{⟨didec expr⟩}
\didec_gsub_check:nn{⟨didec var⟩}{⟨didec expr⟩}
\didec_gsub_to:nnn{⟨didec var⟩}{⟨didec expr$_1$⟩}{⟨didec expr$_2$⟩}
\didec_gsub_to_check:nnn{⟨didec var⟩}{⟨didec expr$_1$⟩}{⟨didec expr$_2$⟩}

- Subtracts the result of computing the ⟨didec expr⟩ to the ⟨didec var⟩
- or sets ⟨didec var⟩ to the difference of ⟨didec expr$_1$⟩ and ⟨didec expr$_2$⟩.
- For \didecsub, if the optional ⟨didec var⟩ is not available, the difference is stored into ⟨didec expr$_1$⟩ which has to be a ⟨didec var⟩ in this case.

```
\didecset{A}{123}
\didecset{B}{5,88}
\didecsub{A}{B}
\didecuse{A}

\didecsub[A]{B}{1000}
\didecuse{A}

\didecsub{A}{-2750}
\didecuse{A}
```

117,12 €
-994,12 €
1.755,88 €

\didecmulfp[⟨didec var2⟩]{⟨didec var⟩}{⟨fp expr⟩}
\didec_gmul_fp:nn{⟨didec var⟩}{⟨fp expr⟩}
\didec_gmul_fp_check:nn{⟨didec var⟩}{⟨fp expr⟩}
\didec_gmul_fp_to:nnn{⟨didec var2⟩}{⟨didec var⟩}{⟨fp expr⟩}
\didec_gmul_fp_to_check:nnn{⟨didec var2⟩}{⟨didec var⟩}{⟨fp expr⟩}

- Multiplies ⟨didec var⟩ with the result of computing the ⟨fp expr⟩
- and sets ⟨didec var⟩ or respectively ⟨didec var2⟩ to the result.

```
\didecset{A}{123}
\didecmulfp{A}{0.9675}
\didecuse{A}

\didecmulfp[B]{A}{ln(42)}
\didecuse{B}
```

119,00 €
444,78 €

\didecdivfp[⟨didec var2⟩]{⟨didec var⟩}{⟨fp expr⟩}
\didec_gdiv_fp:nn{⟨didec var⟩}{⟨fp expr⟩}
\didec_gdiv_fp_check:nn{⟨didec var⟩}{⟨fp expr⟩}
\didec_gdiv_fp_to:nnn{⟨didec var2⟩}{⟨didec var⟩}{⟨fp expr⟩}
\didec_gdiv_fp_to_check:nnn{⟨didec var2⟩}{⟨didec var⟩}{⟨fp expr⟩}

- Divides ⟨didec var⟩ by the result of computing the ⟨fp expr⟩
- and sets ⟨didec var⟩ or respectively ⟨didec var2⟩ to the result.

```
\didecset{A}{123}
\didecdivfp{A}{0.9675}
\didecuse{A}

\didecdivfp[B]{A}{ln(42)}
\didecuse{B}
```

127,13 €
34,01 €

\didecsetsum[⟨didec var⟩]{⟨sum of didec exp⟩}

Sets ⟨didec var⟩ to the result of computing the given ⟨sum of didec exp⟩.
Here, ⟨sum of didec exp⟩ = ⟨didec exp1⟩ + ⟨didec exp2⟩ + . . . + ⟨didec expn⟩

```
\didecset{A}{123}
\didecset{B}{-32.15}
\didecsetsum{A}{ A + B + -22.5 }
\didecuse{A}
```

68,35 €

5 Using didecs

`\didectoint{`⟨*didec var*⟩`}`
`\didec_to_int:n{`⟨*didec var*⟩`}`
`\didec_to_int_check:n{`⟨*didec var*⟩`}`

Expresses the ⟨*didec var*⟩ as Cent integer value, i.e. 100 times the value. All functions are expandable.

```
\didecset{A}{27123.45}
\didectoint{A}

\didecset{A}{-17}
\didectoint{A}
```

```
2712345
-1700
```

`\didectofp{`⟨*didec var*⟩`}`
`\didec_to_fp:n{`⟨*didec var*⟩`}`
`\didec_to_fp_check:n{`⟨*didec var*⟩`}`

Expresses the ⟨*didec var*⟩ as floating-point value. All functions are expandable.

```
\didecset{A}{27123.45}
\didectofp{A}

\didecset{A}{-17}
\didectofp{A}
```

```
27123.45
-17.00
```

`\didectofc{`⟨*didec var*⟩`}`
`\didec_to_fc:n{`⟨*didec var*⟩`}`
`\didec_to_fc_check:n{`⟨*didec var*⟩`}`

Expresses the ⟨*didec var*⟩ as floating-comma value. All functions are expandable.

```
\didecset{A}{27123.45}
\didectofc{A}

\didecset{A}{-17}
\didectofc{A}
```

```
27123,45
-17,00
```

\didecuse[⟨key list⟩]{⟨didec var⟩}
\didec_use:n{⟨didec var⟩}
\didec_use_check:n{⟨didec var⟩}

Expresses the ⟨didec var⟩ as formatted value. With \didecsetup → P. 13, the standard format can be set. This standard format can be overwritten by ⟨key list⟩.

```
\didecset{A}{123456.78}
\didecuse{A}

\didecuse[
    currency           = {\pounds}{},
    decimal-separator  = {.},
    grouping-separator = {,},
  ]{A}
```

123.456,78 €
£123,456.78

\dideccoluse[⟨key list⟩]{⟨didec var⟩}
\didec_color_use:n{⟨didec var⟩}
\didec_color_use_check:n{⟨didec var⟩}

Expresses the ⟨didec var⟩ as colorized formatted value. With \didecsetup → P. 13, the standard format can be set. This standard format can be overwritten by ⟨key list⟩.

```
\didecset{A}{123456.78}
\dideccoluse{A}

\didecset{A}{-125}
\dideccoluse{A}

\dideccoluse[color-negative=didec-blue]{A}
```

123.456,78 €
-125,00 €
-125,00 €

\dideccolinvuse[⟨key list⟩]{⟨didec var⟩}
\didec_color_inverse_use:n{⟨didec var⟩}
\didec_color_inverse_use_check:n{⟨didec var⟩}

Expresses the ⟨didec var⟩ as colorized formatted value. The coloring is switched between positive and negative. The standard coloring and format can be overwritten by ⟨key list⟩.

```
\didecset{A}{123456.78}
\dideccolinvuse{A}

\didecset{A}{-125}
\dideccolinvuse{A}
```

123.456,78 €
-125,00 €

`\didecformat[`⟨*key list*⟩`]{`⟨*didec expr*⟩`}`
`\dideccolformat[`⟨*key list*⟩`]{`⟨*didec expr*⟩`}`
`\dideccolinvformat[`⟨*key list*⟩`]{`⟨*didec expr*⟩`}`

Like `\didecuse` → P. 12, `\dideccoluse` → P. 12, `\dideccolinvuse` → P. 12, but accepts a ⟨*didec expr*⟩ instead of a ⟨*didec var*⟩. If the ⟨*didec expr*⟩ is a ⟨*didec var*⟩, `\didecuse` → P. 12, `\dideccoluse` → P. 12, `\dideccolinvuse` → P. 12 are more efficient.

```
\didecformat{123456.78}\\
\didecformat{A}\\
\didecformat[english]{123456.78}\\
\dideccolformat{123456.78}\\
\dideccolinvformat{123456.78}
```

123.456,78 €
-125,00 €
123,456.78
123.456,78 €
123.456,78 €

`\didecsetup{`⟨*key list*⟩`}`

Sets all keys of the given ⟨*key list*⟩. See the following documentation for available settings.

```
\didecsetup{
    currency           = {\pounds}{},
    decimal-separator  = {.},
    grouping-separator = {,},
}
\didecset{A}{123456.78}
\didecuse{A}
```

£123,456.78

didec/decimal-separator={⟨*separator*⟩} (initially ,)

Sets some ⟨*separator*⟩ as decimal separator.

```
\didecset{A}{123456.78}
\didecuse[ decimal-separator={\#} ]{A} \par
```

123.456#78 €

didec/grouping-separator={⟨*separator*⟩} (initially .)

Sets some ⟨*separator*⟩ as grouping separator.

```
\didecset{A}{123456.78}
\didecuse[ grouping-separator={'} ]{A}
```

123’456,78 €

didec/currency={⟨*prefix*⟩}{⟨*postfix*⟩} (initially empty)

Sets some ⟨*prefix*⟩ and ⟨*postfix*⟩ to denote the currency of the didec variable. This also sets didec/currency-negative{⟨*prefix*⟩-}{⟨*postfix*⟩}

```
\didecset{A}{123456.78}
\didecuse[ currency = {\pounds}{} ]{A} \par
\didecuse[ currency = {}{\:Gulden} ]{A}
```

£123.456,78
123.456,78 Gulden

didec/currency-negative={⟨*prefix*⟩}{⟨*postfix*⟩} (initially empty)

Sets some ⟨*prefix*⟩ and ⟨*postfix*⟩ to denote the currency of the didec variable, if the resulting value is negative. Otherwise, the settings of didec/currency are used. Note that you need to set a minus sign - explicitly, if you want to see it. Also note that setting didec/currency overwrites values given by didec/currency-negative.

```
\didecset{A}{-123456.78}
\didecuse{A}\par
\didecuse[ currency-negative = {$-$}{\;€} ]{A} \par
\didecuse[ currency-negative = {(}{\;€)} ]{A} \par
\didecuse[ currency-negative = {(}{)\;€} ]{A} \par
\didecuse[ currency-negative = {-€}{} ]{A} \par
```

-123.456,78 €
−123.456,78 €
(123.456,78 €)
(123.456,78) €
-€123.456,78

didec/german (style)
didec/english (style)
didec/french (style)
didec/float (style)

Styles to set some format preferences combined. Any currency settings are removed and should be applied afterwards, if needed. Note that \didectofp → P. 11 is more efficient than \didecuse → P. 12 with style didec/float.

	german	english	french	float
decimal-separator	,	.	,	.
grouping-separator	.	,	\;	

```
\didecset{A}{12345678.90}
\didecuse[german]{A}  \par
\didecuse[english]{A} \par
\didecuse[french]{A}  \par
\didecuse[float]{A}   \par
```

12.345.678,90
12,345,678.90
12 345 678,90
12345678.90

didec/color-positive=⟨*positive color*⟩ (initially didec-green)
didec/color-negative=⟨*negative color*⟩ (initially didec-red)

Sets ⟨*positive color*⟩ to denote positive (and zero) values and ⟨*negative color*⟩ to denote negative values. Any valid l3color ⟨*color expression*⟩ can be used. The package defines additional colors

- didec-green
- didec-red
- didec-blue

```
\didecset{A}{123456.78}
\dideccoluse[ color-positive = magenta ]{A}
```

123.456,78 €

\didecwrite{⟨*didec var*⟩}{⟨*stream*⟩}
\didec_write:nn{⟨*didec var*⟩}{⟨*stream*⟩}
\didec_write_check:nn{⟨*didec var*⟩}{⟨*stream*⟩}

Writes \didecset → P. 7{⟨*didec var*⟩}{⟨*current value*⟩} to the given already opened output ⟨*stream*⟩.

```
\didecwrite{A}{output}
% writes to output:
% \didecset{A}{VALUE}
```

6 Didec conditionals

\didecifpositive{⟨*didec var*⟩}{⟨*true code*⟩}{⟨*false code*⟩}
\didec_if_positive_p:n{⟨*didec var*⟩}
\didec_if_positive:nTF{⟨*didec var*⟩}{⟨*true code*⟩}{⟨*false code*⟩}
\didec_if_positive:nT{⟨*didec var*⟩}{⟨*true code*⟩}
\didec_if_positive:nF{⟨*didec var*⟩}{⟨*false code*⟩}

Evaluates the ⟨*didec var*⟩ and returns `true` or executes the ⟨*true code*⟩ if the value is positive, otherwise returns `false` or executes the ⟨*false code*⟩.

```
\didecset{A}{2799.50}
\didecuse{A} is \didecifpositive{A}{positive}{not positive}.

\didecset{B}{-584}
\didecuse{B} is \didecifpositive{B}{positive}{not positive}.

\didecset{A}{0}
\didecuse{A} is \didecifpositive{A}{positive}{not positive}.
```

2.799,50 € is positive.
-584,00 € is not positive.
0,00 € is not positive.

\didecifnegative{⟨*didec var*⟩}{⟨*true code*⟩}{⟨*false code*⟩}
\didec_if_negative_p:n{⟨*didec var*⟩}
\didec_if_negative:nTF{⟨*didec var*⟩}{⟨*true code*⟩}{⟨*false code*⟩}
\didec_if_negative:nT{⟨*didec var*⟩}{⟨*true code*⟩}
\didec_if_negative:nF{⟨*didec var*⟩}{⟨*false code*⟩}

Evaluates the ⟨*didec var*⟩ and returns `true` or executes the ⟨*true code*⟩ if the value is negative, otherwise returns `false` or executes the ⟨*false code*⟩.

```
\didecset{A}{2799.50}
\didecuse{A} is \didecifnegative{A}{negative}{not negative}.

\didecset{B}{-584}
\didecuse{B} is \didecifnegative{B}{negative}{not negative}.

\didecset{A}{0}
\didecuse{A} is \didecifnegative{A}{negative}{not negative}.
```

2.799,50 € is not negative.
-584,00 € is negative.
0,00 € is not negative.

\didecifzero{⟨didec var⟩}{⟨true code⟩}{⟨false code⟩}
\didec_if_zero_p:n{⟨didec var⟩}
\didec_if_zero:nTF{⟨didec var⟩}{⟨true code⟩}{⟨false code⟩}
\didec_if_zero:nT{⟨didec var⟩}{⟨true code⟩}
\didec_if_zero:nF{⟨didec var⟩}{⟨false code⟩}

Evaluates the ⟨didec var⟩ and returns `true` or executes the ⟨true code⟩ if the value is zero, otherwise returns `false` or executes the ⟨false code⟩.

```
\didecset{A}{2799.50}
\didecuse{A} is \didecifzero{A}{zero}{not zero}.

\didecset{B}{-584}
\didecuse{B} is \didecifzero{B}{zero}{not zero}.

\didecset{A}{0}
\didecuse{A} is \didecifzero{A}{zero}{not zero}.
```

2.799,50 € is not zero.
-584,00 € is not zero.
0,00 € is zero.

\dideciflowerthan{⟨didec $expr_1$⟩}{⟨didec $expr_2$⟩}{⟨true code⟩}{⟨false code⟩}
\didecifequal{⟨didec $expr_1$⟩}{⟨didec $expr_2$⟩}{⟨true code⟩}{⟨false code⟩}
\didecifgreaterthan{⟨didec $expr_1$⟩}{⟨didec $expr_2$⟩}{⟨true code⟩}{⟨false code⟩}
\didec_compare_p:nNn{⟨didec $expr_1$⟩}⟨relation⟩{⟨didec $expr_2$⟩}
\didec_compare:nNnTF{⟨didec $expr_1$⟩}⟨relation⟩{⟨didec $expr_2$⟩}{⟨true code⟩}{⟨false code⟩}
\didec_compare:nNnT{⟨didec $expr_1$⟩}⟨relation⟩{⟨didec $expr_2$⟩}{⟨true code⟩}
\didec_compare:nNnF{⟨didec $expr_1$⟩}⟨relation⟩{⟨didec $expr_2$⟩}{⟨false code⟩}

Compares the ⟨didec $expr_1$⟩ and the ⟨didec $expr_2$⟩, and returns `true` or executes the ⟨true code⟩ if the ⟨relation⟩ (given by function respectively) is obeyed, otherwise returns `false` or executes the ⟨false code⟩.

```
\didecset{A}{2799.50}
\didecset{B}{-584}
\didecuse{A} is \dideciflowerthan{A}{B}{lower}{not lower} than \didecuse{B}

\didecuse{A} is \didecifequal{A}{B}{equal}{not equal} to \didecuse{B}

\didecuse{A} is \didecifequal{A}{A}{equal}{not equal} to \didecuse{A}

\didecuse{A} is \didecifgreaterthan{A}{B}{greater}{not greater} than
↪  \didecuse{B}
```

2.799,50 € is lower than -584,00 €
2.799,50 € is equal to -584,00 €
2.799,50 € is equal to 2.799,50 €
2.799,50 € is greater than -584,00 €

7 Viewing didecs

`\didec_show:n{`⟨*didec var*⟩`}`

Displays the content of ⟨*didec var*⟩ in the terminal.

```
\didecset{A}{2799.50}
\ExplSyntaxOn
\didec_show:n{A}
\ExplSyntaxOff
```

Index

\c_didec_kernel_str, 6
color-negative key, 15
color-positive key, 15
Colors
    didec-blue, 15
    didec-green, 15
    didec-red, 15
Commands
    \c_didec_kernel_str, 6
    \didec_color_inverse_use:n, 12
    \didec_color_inverse_use_check:n, 12
    \didec_color_use:n, 12
    \didec_color_use_check:n, 12
    \didec_compare:nNnF, 17
    \didec_compare:nNnT, 17
    \didec_compare:nNnTF, 17
    \didec_compare_p:nNn, 17
    \didec_gadd:nn, 9
    \didec_gadd_check:nn, 9
    \didec_gadd_to:nnn, 9
    \didec_gadd_to_check:nnn, 9
    \didec_gdiv_fp:nn, 10
    \didec_gdiv_fp_check:nn, 10
    \didec_gdiv_fp_to:nnn, 10
    \didec_gdiv_fp_to_check:nnn, 10
    \didec_gmul_fp:nn, 10
    \didec_gmul_fp_check:nn, 10
    \didec_gmul_fp_to:nnn, 10
    \didec_gmul_fp_to_check:nnn, 10
    \didec_gset:nn, 7
    \didec_gset_check:nn, 7
    \didec_gset_eq:nn, 7
    \didec_gset_eq_check:nn, 7
    \didec_gset_fp:nn, 8
    \didec_gset_fp_check:nn, 8
    \didec_gset_negative:nn, 8
    \didec_gset_negative_check:nn, 8
    \didec_gsub:nn, 9
    \didec_gsub_check:nn, 9
    \didec_gsub_to:nnn, 9
    \didec_gsub_to_check:nnn, 9
    \didec_if_kernel_fp:T, 6
    \didec_if_kernel_fp:TF, 6
    \didec_if_kernel_fp_p:, 6
    \didec_if_kernel_int:T, 6
    \didec_if_kernel_int:TF, 6
    \didec_if_kernel_int_p:, 6
    \didec_if_negative:nF, 16
    \didec_if_negative:nT, 16
    \didec_if_negative:nTF, 16
    \didec_if_negative_p:n, 16
    \didec_if_positive:nF, 16
    \didec_if_positive:nT, 16
    \didec_if_positive:nTF, 16
    \didec_if_positive_p:n, 16
    \didec_if_zero:nF, 17
    \didec_if_zero:nT, 17
    \didec_if_zero:nTF, 17
    \didec_if_zero_p:n, 17
    \didec_new:n, 7
    \didec_show:n, 18
    \didec_to_fc:n, 11
    \didec_to_fc_check:n, 11
    \didec_to_fp:n, 11
    \didec_to_fp_check:n, 11
    \didec_to_int:n, 11
    \didec_to_int_check:n, 11
    \didec_use:n, 12
    \didec_use_check:n, 12
    \didec_write:nn, 15
    \didec_write_check:nn, 15
    \didecadd, 9
    \dideccolformat, 13
    \dideccolinvformat, 13
    \dideccolinvuse, 12
    \dideccoluse, 12
    \didecdivfp, 10
    \didecformat, 13
    \didecifequal, 17
    \didecifgreaterthan, 17
    \dideciflowerthan, 17
    \didecifnegative, 16
    \didecifpositive, 16
    \didecifzero, 17
    \didecmulfp, 10
    \didecnew, 7
    \didecset, 7
    \didecsetequal, 7
    \didecsetfp, 8
    \didecsetnegative, 8
    \didecsetsum, 10
    \didecsetup, 13
    \didecsub, 9
    \didectofc, 11
    \didectofp, 11
    \didectoint, 11
    \didecuse, 12
    \didecwrite, 15
currency key, 14
currency-negative key, 14

decimal-separator key, 14
didec-blue color, 15
didec-green color, 15
didec-red color, 15
\didec_color_inverse_use:n, 12
\didec_color_inverse_use_check:n, 12
\didec_color_use:n, 12
\didec_color_use_check:n, 12
\didec_compare:nNnF, 17
\didec_compare:nNnT, 17
\didec_compare:nNnTF, 17

\didec_compare_p:nNn, 17
\didec_gadd:nn, 9
\didec_gadd_check:nn, 9
\didec_gadd_to:nnn, 9
\didec_gadd_to_check:nnn, 9
\didec_gdiv_fp:nn, 10
\didec_gdiv_fp_check:nn, 10
\didec_gdiv_fp_to:nnn, 10
\didec_gdiv_fp_to_check:nnn, 10
\didec_gmul_fp:nn, 10
\didec_gmul_fp_check:nn, 10
\didec_gmul_fp_to:nnn, 10
\didec_gmul_fp_to_check:nnn, 10
\didec_gset:nn, 7
\didec_gset_check:nn, 7
\didec_gset_eq:nn, 7
\didec_gset_eq_check:nn, 7
\didec_gset_fp:nn, 8
\didec_gset_fp_check:nn, 8
\didec_gset_negative:nn, 8
\didec_gset_negative_check:nn, 8
\didec_gsub:nn, 9
\didec_gsub_check:nn, 9
\didec_gsub_to:nnn, 9
\didec_gsub_to_check:nnn, 9
\didec_if_kernel_fp:T, 6
\didec_if_kernel_fp:TF, 6
\didec_if_kernel_fp_p:, 6
\didec_if_kernel_int:T, 6
\didec_if_kernel_int:TF, 6
\didec_if_kernel_int_p:, 6
\didec_if_negative:nF, 16
\didec_if_negative:nT, 16
\didec_if_negative:nTF, 16
\didec_if_negative_p:n, 16
\didec_if_positive:nF, 16
\didec_if_positive:nT, 16
\didec_if_positive:nTF, 16
\didec_if_positive_p:n, 16
\didec_if_zero:nF, 17
\didec_if_zero:nT, 17
\didec_if_zero:nTF, 17
\didec_if_zero_p:n, 17
\didec_new:n, 7
\didec_show:n, 18
\didec_to_fc:n, 11
\didec_to_fc_check:n, 11
\didec_to_fp:n, 11
\didec_to_fp_check:n, 11
\didec_to_int:n, 11
\didec_to_int_check:n, 11
\didec_use:n, 12
\didec_use_check:n, 12
\didec_write:nn, 15
\didec_write_check:nn, 15
\didecadd, 9
\dideccolformat, 13
\dideccolinvformat, 13
\dideccolinvuse, 12
\dideccoluse, 12
\didecdivfp, 10
\didecformat, 13
\didecifequal, 17
\didecifgreaterthan, 17
\dideciflowerthan, 17
\didecifnegative, 16
\didecifpositive, 16
\didecifzero, 17
\didecmulfp, 10
\didecnew, 7
\didecset, 7
\didecsetequal, 7
\didecsetfp, 8
\didecsetnegative, 8
\didecsetsum, 10
\didecsetup, 13
\didecsub, 9
\didectofc, 11
\didectofp, 11
\didectoint, 11
\didecuse, 12
\didecwrite, 15

english key, 15

float key, 15
fp package option, 4
french key, 15

german key, 15
grouping-separator key, 14

int package option, 4

Keys
  didec/
    color-negative, 15
    color-positive, 15
    currency, 14
    currency-negative, 14
    decimal-separator, 14
    english, 15
    float, 15
    french, 15
    german, 15
    grouping-separator, 14

Package options
  didec/
    fp, 4
    int, 4