The fibnum package

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Abstract

The package fibnum provides expandable fibonacci numbers for both LaTeX and plain TeX.

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1 Documentation

In the mailing list texhax Jan Abraham asked the question, how to get Fibonacci numbers in TeX [1]:

> Write a Macro in TeX that compute the function `\fib{m}` All fibonacci numbers from 1 to m ($m < 40$).

*Please report any issues at https://github.com/ho-tex/oberdiek/issues

This packages provides an expandable implementation for the calculation of these numbers for a much larger set of indexes. For practical reasons the index is restricted to the same limitations that apply for TEX integer numbers. The range of the Fibonacci numbers, however, are not limited by the algorithm. They are only restricted to memory limitations, if they are hit.

The package is loaded as LATEX package in LATEX:

```
\usepackage{fibnum}
```

and as file in plain TEX:

```
\input fibnum.sty
```

The package does not know any options and it provides the macros `\fibnum` and `\fibnumPreCalc`.

`\fibnum {`⟨*index*⟩`}`

Macro `\fibnum` expects a TEX number as ⟨*index*⟩ in the official TEX number range from $-(2^{31}-1)$ up to $2^{31}-1$. In exact two expansion steps the macro expands to the Fibnoacci number $F_{\langle\, index\rangle}$. In case of a negative ⟨*index*⟩, the "negafibonacci" number [2] is used. Formally the Fibonacci number F_n with integer index n, $n \in \mathbb{Z}$ and $n \in [-2\,147\,483\,647\ , 2\,147\,483\,647\ ]$ that is returned by macro `\fibnum` with numerical argument n is defined the following way:

$$F_n = \begin{cases} 0 & \text{for } n = 0 \\ 1 & \text{for } n = 1 \\ F_{n-1} + F_{n-2} & \text{for } n > 1 \\ (-1)^{n+1} F_n & \text{for } n < 0 \end{cases} \tag{1}$$

Examples:

```
\fibnum{-6}   → -8
\fibnum{-5}   →  5
\fibnum{-4}   → -3
\fibnum{-3}   →  2
\fibnum{-2}   → -1
\fibnum{-1}   →  1
\fibnum{0}    →  0
\fibnum{1}    →  1
\fibnum{2}    →  1
\fibnum{3}    →  2
\fibnum{4}    →  3
\fibnum{5}    →  5
\fibnum{6}    →  8
        ⋮
\fibnum{10}   →  55
        ⋮
\fibnum{46}   →  1836311903
        ⋮
\fibnum{100}  →  354224848179261915075
        ⋮
\fibnum{200}  →  280571172992510140037611932413038677189525
        ⋮
\fibnum{1000} →  43466557686937456435688527675040625802564
                 60517371780402481729089536555417949051890
                 40387984007925516929592259308032263477520
                 96896232398733224711616429964409065331879382
                 98969649928516003704476137795166849228875
```

`\fibnumPreCalc {⟨index⟩}`

The package already provides precalculated Fibonacci numbers up to index 46. That means that calculations are not necessary for Fibonacci numbers that fit into the range of TEX numbers. Because macro `\fibnum` is expandable, it cannot store calculated Fibonacci numbers for later use. Macro definitions are forbidden in expandable contexts. If larger Fibonacci numbers are used more than once, than the compilation time can be shortened by calculating and storing the Fibonacci numbers beforehand. The argument ⟨*index*⟩ is a TEX number and macro `\fibnumPreCalc` ensures that the Fibonacci numbers F_0 up to $F_{|\langle\, index\rangle\,|}$ that are not already known are calculated and stored in internal macros. Internally only non-negative Fibonacci numbers are stored. If ⟨*index*⟩ is negative, then the needed positive Fibonacci numbers are calculated and stored. Example:

```
\fibnumPreCalc{50}
% calculates and stores the values for indexes 47..50.
% (Values for 0..46 are already stored by the package.)
\fibnum{49} % uses the stored value
\fibnum{51} % only calculates F_51 from stored values F_49 and F_50
\fibnumPreCalc{100}
% calculates and stores the values for indexes 51..100
\fibnum{100} % uses the stored value for F_100
\fibnum{-100} % uses the stored value for F_100
% F_-100 = -F_100 according to equation (1).
```

2 Implementation

2.1 Identification

```
1 ⟨*package⟩
```

Reload check, especially if the package is not used with LATEX.

```
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@fibnum.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{fibnum}{The package is already loaded}%
29      \aftergroup\endinput
30    \fi
```

```
  \fi
\endgroup%
```
Package identification:
```
\begingroup\catcode61\catcode48\catcode32=10\relax%
  \catcode13=5 % ^^M
  \endlinechar=13 %
  \catcode35=6 % #
  \catcode39=12 % '
  \catcode40=12 % (
  \catcode41=12 % )
  \catcode44=12 % ,
  \catcode45=12 % -
  \catcode46=12 % .
  \catcode47=12 % /
  \catcode58=12 % :
  \catcode64=11 % @
  \catcode91=12 % [
  \catcode93=12 % ]
  \catcode123=1 % {
  \catcode125=2 % }
  \expandafter\ifx\csname ProvidesPackage\endcsname\relax
    \def\x#1#2#3[#4]{\endgroup
      \immediate\write-1{Package: #3 #4}%
      \xdef#1{#4}%
    }%
  \else
    \def\x#1#2[#3]{\endgroup
      #2[{#3}]%
      \ifx#1\@undefined
        \xdef#1{#3}%
      \fi
      \ifx#1\relax
        \xdef#1{#3}%
      \fi
    }%
  \fi
\expandafter\x\csname ver@fibnum.sty\endcsname
\ProvidesPackage{fibnum}%
  [2016/05/16 v1.1 Fibonacci numbers (HO)]%
\begingroup\catcode61\catcode48\catcode32=10\relax%
  \catcode13=5 % ^^M
  \endlinechar=13 %
  \catcode123=1 % {
  \catcode125=2 % }
  \catcode64=11 % @
  \def\x{\endgroup
    \expandafter\edef\csname FibNum@AtEnd\endcsname{%
      \endlinechar=\the\endlinechar\relax
      \catcode13=\the\catcode13\relax
      \catcode32=\the\catcode32\relax
      \catcode35=\the\catcode35\relax
      \catcode61=\the\catcode61\relax
      \catcode64=\the\catcode64\relax
      \catcode123=\the\catcode123\relax
      \catcode125=\the\catcode125\relax
    }%
  }%
\x\catcode61\catcode48\catcode32=10\relax%
\catcode13=5 % ^^M
\endlinechar=13 %
\catcode35=6 % #
\catcode64=11 % @
```

```
\catcode123=1 % {
\catcode125=2 % }
\def\TMP@EnsureCode#1#2{%
  \edef\FibNum@AtEnd{%
    \FibNum@AtEnd
    \catcode#1=\the\catcode#1\relax
  }%
  \catcode#1=#2\relax
}
\TMP@EnsureCode{33}{12}% !
%\TMP@EnsureCode{36}{3}% $
%\TMP@EnsureCode{38}{4}% &
\TMP@EnsureCode{40}{12}% (
\TMP@EnsureCode{41}{12}% )
\TMP@EnsureCode{45}{12}% -
\TMP@EnsureCode{46}{12}% .
\TMP@EnsureCode{47}{12}% /
\TMP@EnsureCode{58}{12}% :
\TMP@EnsureCode{60}{12}% <
\TMP@EnsureCode{62}{12}% >
\TMP@EnsureCode{91}{12}% [
%\TMP@EnsureCode{96}{12}% `
\TMP@EnsureCode{93}{12}% ]
%\TMP@EnsureCode{94}{12}% ^ (superscript) (!)
%\TMP@EnsureCode{124}{12}% |
\edef\FibNum@AtEnd{\FibNum@AtEnd\noexpand\endinput}
```

2.2 Package resources

```
\begingroup\expandafter\expandafter\expandafter\endgroup
\expandafter\ifx\csname RequirePackage\endcsname\relax
  \def\TMP@RequirePackage#1[#2]{%
    \begingroup\expandafter\expandafter\expandafter\endgroup
    \expandafter\ifx\csname ver@#1.sty\endcsname\relax
      \input #1.sty\relax
    \fi
  }%
  \TMP@RequirePackage{ltxcmds}[2011/04/18]%
  \TMP@RequirePackage{intcalc}[2007/09/27]%
  \TMP@RequirePackage{bigintcalc}[2007/11/11]%
\else
  \RequirePackage{ltxcmds}[2011/04/18]%
  \RequirePackage{intcalc}[2007/09/27]%
  \RequirePackage{bigintcalc}[2007/11/11]%
\fi
```

2.3 Setup precalculated values

```
\def\FibNum@temp#1{%
  \expandafter\def\csname FibNum@#1\endcsname
}
\catcode46=9 % dots are ignored
\FibNum@temp{0}{0}
\FibNum@temp{1}{1}
\FibNum@temp{2}{1}
\FibNum@temp{3}{2}
\FibNum@temp{4}{3}
\FibNum@temp{5}{5}
\FibNum@temp{6}{8}
\FibNum@temp{7}{13}
\FibNum@temp{8}{21}
\FibNum@temp{9}{34}
\FibNum@temp{10}{55}
\FibNum@temp{11}{89}
```

```
\FibNum@temp{12}{144}
\FibNum@temp{13}{233}
\FibNum@temp{14}{377}
\FibNum@temp{15}{610}
\FibNum@temp{16}{987}
\FibNum@temp{17}{1.597}
\FibNum@temp{18}{2.584}
\FibNum@temp{19}{4.181}
\FibNum@temp{20}{6.765}
\FibNum@temp{21}{10.946}
\FibNum@temp{22}{17.711}
\FibNum@temp{23}{28.657}
\FibNum@temp{24}{46.368}
\FibNum@temp{25}{75.025}
\FibNum@temp{26}{121.393}
\FibNum@temp{27}{196.418}
\FibNum@temp{28}{317.811}
\FibNum@temp{29}{514.229}
\FibNum@temp{30}{832.040}
\FibNum@temp{31}{1.346.269}
\FibNum@temp{32}{2.178.309}
\FibNum@temp{33}{3.524.578}
\FibNum@temp{34}{5.702.887}
\FibNum@temp{35}{9.227.465}
\FibNum@temp{36}{14.930.352}
\FibNum@temp{37}{24.157.817}
\FibNum@temp{38}{39.088.169}
\FibNum@temp{39}{63.245.986}
\FibNum@temp{40}{102.334.155}
\FibNum@temp{41}{165.580.141}
\FibNum@temp{42}{267.914.296}
\FibNum@temp{43}{433.494.437}
\FibNum@temp{44}{701.408.733}
\FibNum@temp{45}{1.134.903.170}
\FibNum@temp{46}{1.836.311.903}
```

\FibNum@max

```
\def\FibNum@max{46}
```

2.4 Macros for precalculating values

\fibnumPreCalc

```
\def\fibnumPreCalc#1{%
  \expandafter\expandafter\expandafter
  \FibNum@PreCalc\intcalcNum{#1}/%
}
```

\FibNum@PreCalc

```
\def\FibNum@PreCalc#1/{%
  \ifnum#1<\ltx@zero
    \expandafter\FibNum@PreCalc\ltx@gobble#1/%
  \else
    \ifnum#1>\FibNum@max
      \begingroup
        \ltx@LocDimenA=#1sp\relax
        \countdef\FibNum@i=255\relax
        \FibNum@i=\FibNum@max\relax
        \edef\FibNum@temp{%
          \csname FibNum@\the\FibNum@i\endcsname/%
        }%
        \advance\FibNum@i by -1\relax
        \edef\FibNum@temp{%
```

```
        \FibNum@temp
        \csname FibNum@\the\FibNum@i\endcsname
      }%
      \advance\FibNum@i\ltx@two
      \iftrue
        \expandafter\FibNum@PreCalcAux\FibNum@temp
      \fi
    \endgroup
  \fi
\fi
}
```

\FibNum@PreCalcAux

```
\def\FibNum@PreCalcAux#1/#2\fi{%
  \fi
  \edef\FibNum@temp{\BigIntCalcAdd#1!#2!}%
  \global\expandafter
  \let\csname FibNum@\the\FibNum@i\endcsname\FibNum@temp
  \ifnum\FibNum@i=\ltx@LocDimenA
    \xdef\FibNum@max{\the\FibNum@i}%
  \else
    \advance\FibNum@i\ltx@one
    \expandafter\FibNum@PreCalcAux\FibNum@temp/#1%
  \fi
}
```

2.5 Expandable calculations

\fibnum

```
\def\fibnum#1{%
  \romannumeral
  \expandafter\expandafter\expandafter\FibNum@Do\intcalcNum{#1}/%
}
```

\FibNum@Do

```
\def\FibNum@Do#1/{%
  \ifnum#1<\ltx@zero
    \FibNum@ReturnAfterElseFiFi{%
      \ifodd#1 %
        \expandafter\expandafter\expandafter\ltx@zero
      \else
        \expandafter\expandafter\expandafter\ltx@zero
        \expandafter\expandafter\expandafter-%
      \fi
      \romannumeral
      \expandafter\FibNum@Do\ltx@gobble#1/%
    }%
  \else
    \ifnum\FibNum@max<#1 %
      \ltx@ReturnAfterElseFi{%
        \expandafter
        \FibNum@ExpCalc\number\expandafter\IntCalcInc\FibNum@max!%
        \expandafter\expandafter\expandafter/%
        \csname FibNum@\FibNum@max
        \expandafter\expandafter\expandafter\endcsname
        \expandafter\expandafter\expandafter/%
        \csname FibNum@\expandafter\IntCalcDec\FibNum@max!%
        \endcsname/%
        #1%
      }%
    \else
      \expandafter\expandafter\expandafter\ltx@zero
```

```
      \csname FibNum@#1\expandafter\expandafter\expandafter\endcsname
    \fi
  \fi
}
```

\FibNum@ReturnAfterElseFiFi

```
\def\FibNum@ReturnAfterElseFiFi#1\else#2\fi\fi{\fi#1}
```

\FibNum@ExpCalc

```
\def\FibNum@ExpCalc#1/#2/#3/#4\fi{%
  \fi
  \ifnum#1=#4 %
    \ltx@ReturnAfterElseFi{%
      \expandafter\expandafter\expandafter\ltx@zero
      \BigIntCalcAdd#2!#3!%
    }%
  \else
    \expandafter\FibNum@ExpCalc
    \number\IntCalcInc#1!%
    \expandafter\expandafter\expandafter/%
    \BigIntCalcAdd#2!#3!/%
    #2/#4%
  \fi
}

\FibNum@AtEnd%
⟨/package⟩
```

3 Test

3.1 Catcode checks for loading

```
⟨*test1⟩

\catcode`\{=1 %
\catcode`\}=2 %
\catcode`\#=6 %
\catcode`\@=11 %
\expandafter\ifx\csname count@\endcsname\relax
  \countdef\count@=255 %
\fi
\expandafter\ifx\csname @gobble\endcsname\relax
  \long\def\@gobble#1{}%
\fi
\expandafter\ifx\csname @firstofone\endcsname\relax
  \long\def\@firstofone#1{#1}%
\fi
\expandafter\ifx\csname loop\endcsname\relax
  \expandafter\@firstofone
\else
  \expandafter\@gobble
\fi
{%
  \def\loop#1\repeat{%
    \def\body{#1}%
    \iterate
  }%
  \def\iterate{%
    \body
      \let\next\iterate
    \else
      \let\next\relax
```

```
    \fi
    \next
  }%
  \let\repeat=\fi
}%
\def\RestoreCatcodes{}
\count@=0 %
\loop
  \edef\RestoreCatcodes{%
    \RestoreCatcodes
    \catcode\the\count@=\the\catcode\count@\relax
  }%
\ifnum\count@<255 %
  \advance\count@ 1 %
\repeat

\def\RangeCatcodeInvalid#1#2{%
  \count@=#1\relax
  \loop
    \catcode\count@=15 %
  \ifnum\count@<#2\relax
    \advance\count@ 1 %
  \repeat
}
\def\RangeCatcodeCheck#1#2#3{%
  \count@=#1\relax
  \loop
    \ifnum#3=\catcode\count@
    \else
      \errmessage{%
        Character \the\count@\space
        with wrong catcode \the\catcode\count@\space
        instead of \number#3%
      }%
    \fi
  \ifnum\count@<#2\relax
    \advance\count@ 1 %
  \repeat
}
\def\space{ }
\expandafter\ifx\csname LoadCommand\endcsname\relax
  \def\LoadCommand{\input fibnum.sty\relax}%
\fi
\def\Test{%
  \RangeCatcodeInvalid{0}{47}%
  \RangeCatcodeInvalid{58}{64}%
  \RangeCatcodeInvalid{91}{96}%
  \RangeCatcodeInvalid{123}{255}%
  \catcode`\@=12 %
  \catcode`\\=0 %
  \catcode`\%=14 %
  \LoadCommand
  \RangeCatcodeCheck{0}{36}{15}%
  \RangeCatcodeCheck{37}{37}{14}%
  \RangeCatcodeCheck{38}{47}{15}%
  \RangeCatcodeCheck{48}{57}{12}%
  \RangeCatcodeCheck{58}{63}{15}%
  \RangeCatcodeCheck{64}{64}{12}%
  \RangeCatcodeCheck{65}{90}{11}%
  \RangeCatcodeCheck{91}{91}{15}%
  \RangeCatcodeCheck{92}{92}{0}%
  \RangeCatcodeCheck{93}{96}{15}%
```

```
  \RangeCatcodeCheck{97}{122}{11}%
  \RangeCatcodeCheck{123}{255}{15}%
  \RestoreCatcodes
}
\Test
\csname @@end\endcsname
\end
```

⟨/test1⟩

3.2 Test calculations

```
⟨*test-calc⟩
\catcode`\{=1 %
\catcode`\}=2 %
\catcode`\#=6 %
\catcode`\@=11 %
\begingroup\expandafter\expandafter\expandafter\endgroup
\expandafter\ifx\csname RequirePackage\endcsname\relax
  \input fibnum.sty\relax
\else
  \RequirePackage{fibnum}[2016/05/16]%
\fi
\def\TestSet{%
  \test{0}{0}%
  \test{1}{1}%
  \test{2}{1}%
  \test{3}{2}%
  \test{4}{3}%
  \test{5}{5}%
  \test{6}{8}%
  \test{7}{13}%
  \test{8}{21}%
  \test{9}{34}%
  \test{10}{55}%
  \test{11}{89}%
  \test{12}{144}%
  \test{13}{233}%
  \test{14}{377}%
  \test{15}{610}%
  \test{16}{987}%
  \test{17}{1597}%
  \test{18}{2584}%
  \test{19}{4181}%
  \test{20}{6765}%
  \test{21}{10946}%
  \test{22}{17711}%
  \test{23}{28657}%
  \test{24}{46368}%
  \test{25}{75025}%
  \test{26}{121393}%
  \test{27}{196418}%
  \test{28}{317811}%
  \test{29}{514229}%
  \test{30}{832040}%
  \test{31}{1346269}%
  \test{32}{2178309}%
  \test{33}{3524578}%
  \test{34}{5702887}%
  \test{35}{9227465}%
  \test{36}{14930352}%
  \test{37}{24157817}%
  \test{38}{39088169}%
  \test{39}{63245986}%
```

```
  \test{40}{102334155}%
  \test{41}{165580141}%
  \test{42}{267914296}%
  \test{43}{433494437}%
  \test{44}{701408733}%
  \test{45}{1134903170}%
  \test{46}{1836311903}%
  \test{47}{2971215073}%
  \test{48}{4807526976}%
  \test{49}{7778742049}%
  \test{50}{12586269025}%
  \test{51}{20365011074}%
  \test{52}{32951280099}%
  \test{53}{53316291173}%
  \test{54}{86267571272}%
  \test{55}{139583862445}%
  \test{56}{225851433717}%
  \test{57}{365435296162}%
  \test{58}{591286729879}%
  \test{59}{956722026041}%
  \test{60}{1548008755920}%
  \test{61}{2504730781961}%
  \test{62}{4052739537881}%
  \test{63}{6557470319842}%
  \test{64}{10610209857723}%
  \test{65}{17167680177565}%
  \test{66}{27777890035288}%
  \test{67}{44945570212853}%
  \test{68}{72723460248141}%
  \test{69}{117669030460994}%
  \test{70}{190392490709135}%
  \test{71}{308061521170129}%
  \test{72}{498454011879264}%
  \test{73}{806515533049393}%
}
\def\msg#{\immediate\write16}
\def\test#1#2{%
  \TestAux{#1}{#2}%
  \ifnum#1=0 %
  \else
    \ifodd#1 %
      \TestAux{-#1}{#2}%
    \else
      \TestAux{-#1}{-#2}%
    \fi
  \fi
}
\def\TestAux#1#2{%
  \def\Expected{#2}%
  \expandafter\expandafter\expandafter\def
  \expandafter\expandafter\expandafter\Result
  \expandafter\expandafter\expandafter{%
    \fibnum{#1}%
  }%
  \ltx@onelevel@sanitize\Result
  \ifx\Result\Expected
    \msg{* #1: ok.}%
  \else
    \msg{! fib(#1) = #2}%
    \errmessage{fib(#1) <> \Result}%
  \fi
}
```

```
\TestSet
\setbox0=\hbox{%
  \msg{* PreCalc{73}}%
  \fibnumPreCalc{73}%
}
\ifdim\wd0=0pt
\else
  \errmessage{Unwanted stuff in PreCalc}%
\fi
\TestSet
\csname @@end\endcsname\end
⟨/test-calc⟩
```

4 Installation

4.1 Download

Package. This package is available on CTAN[1]:

CTAN:macros/latex/contrib/oberdiek/fibnum.dtx The source file.

CTAN:macros/latex/contrib/oberdiek/fibnum.pdf Documentation.

Bundle. All the packages of the bundle 'oberdiek' 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/oberdiek.tds.zip

TDS refers to the standard "A Directory Structure for TEX Files" (CTAN:tds/tds.pdf). Directories with texmf in their name are usually organized this way.

4.2 Bundle installation

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

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

Script installation. Check the directory TDS:scripts/oberdiek/ for scripts that need further installation steps. Package attachfile2 comes with the Perl script pdfatfi.pl that should be installed in such a way that it can be called as pdfatfi. Example (linux):

```
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

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 fibnum.dtx
```

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

```
fibnum.sty              → tex/generic/oberdiek/fibnum.sty
fibnum.pdf              → doc/latex/oberdiek/fibnum.pdf
test/fibnum-test1.tex   → doc/latex/oberdiek/test/fibnum-test1.tex
test/fibnum-test-calc.tex → doc/latex/oberdiek/test/fibnum-test-calc.tex
fibnum.dtx              → source/latex/oberdiek/fibnum.dtx
```

[1] http://ctan.org/pkg/fibnum

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 (teTEX, mikTEX, ...) relies on file name databases, you must refresh these. For example, teTEX users run `texhash` or `mktexlsr`.

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{fibnum.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 pdfLATEX:

```
pdflatex fibnum.dtx
bibtex fibnum.aux
makeindex -s gind.ist fibnum.idx
pdflatex fibnum.dtx
makeindex -s gind.ist fibnum.idx
pdflatex fibnum.dtx
```

5 References

[1] Jan Abraham. *[texhax] Beginner in TEX MACRO to compute functions.* 2012-04-07. URL: http://tug.org/pipermail/texhax/2012-April/019146.html (visited on 2012-04-08).

[2] Wikipedia contributors. *Fibonacci numbers.* Version 486266088. Wikipedia, The Free Encyclopedia. 2012-04-08. URL: http://en.wikipedia.org/w/index.php?title=Fibonacci_number&oldid=486266088 (visited on 2012-04-08).

6 History

[2012/04/08 v1.0]

- First version.

[2016/05/16 v1.1]

- Documentation updates.

7 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.

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