timeop

Calculates and displays arithmetic operations with durations.

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---

```
\simpletimeop{9,45,54}{4,28,57}{14,14,51}
```

$$\begin{array}{rr} & 9\,\text{h}\,45\,\text{min}\,54\,\text{s} \\ + & 4\,\text{h}\,28\,\text{min}\,57\,\text{s} \\ \hline & 14\,\text{h}\,14\,\text{min}\,51\,\text{s} \end{array}$$

```
\calctimeop%
  [type=-]%
  {9,45,54}%
  {9,28,57}
```

$$\begin{array}{rr} & 9\,\text{h}\,45\,\text{min}\,54\,\text{s} \\ - & 9\,\text{h}\,28\,\text{min}\,57\,\text{s} \\ \hline & 0\,\text{h}\,16\,\text{min}\,57\,\text{s} \end{array}$$

```
\calctimeop%
  [find={-,-,-,-,-,-,blue,yellow,red}]%
  {9,45,54}%
  {4,28,57}
```

$$\begin{array}{rr} & 9\,\text{h}\,45\,\text{min}\,54\,\text{s} \\ + & 4\,\text{h}\,28\,\text{min}\,57\,\text{s} \\ \hline & \square\,\text{h}\,\square\,\text{min}\,\square\,\text{s} \end{array}$$

Contents

1 History & Future

`0.1.1:` `Bugfix`
`0.1.0:` `Initial version`

2 Introduction

2.1 Loading, useful packages

In order to load `timeop`, simply use:

```
\usepackage{timeop}
```

Loaded packages are `xstring`, `xintexpr`, `listofitems`, `tabularray`, `simplekv` and `tcolorbox`.
Loaded libraries are `skins`.
If `amsmath` doen't need to be loaded (useful for int. macro), just add `[noamssymb]` to the loading.

```
%w/o amsmath loading
\usepackage[noamsmath]{timeop}
```

2.2 Special macro

Special macros are available, to mark a *finding number*, which is adapted to current font.

```
\boxhms{red} / \boxhms{yellow} / \boxhms{orange} / \boxhms{teal}
```

3 Usage

3.1 Conversion s–hms or hm(s)–s

First available macros can convert times within hms and s.

```
%convert hm to s
\hmtos{h,m}[\macro]
%convert hms to s
\hmstos{h,min,s}[\macro]
%convert and/or print s to hms
\stohms[keys]{s}[\macro]
```

Available keys are:

- `sys` : version of formatting system (`eu` by default);
- `zeros` : boolean for leading zeros (`true` by default);
- `raw` : boolean for storing raw result into `[\macro]` (`true` by default).

If `[raw=false]`, the code format the result within `hh h mm min ss s` main format (zero value are not printed).

```
\hmtos{1,45}\convtosec\\
\hmstos{9,45,54}\convtosec\\
\stohms{35154}\convtohms
```

6300
35154
9,45,54

```
\stohms[raw=false]{1000}\\
\stohms[raw=false]{36000}\\
\stohms[raw=false,zeros=false]{36120}\\
\stohms[raw=false]{36010}\\
\stohms[raw=false]{3599}\\
\stohms[raw=false,sys=en]{3599}
```

16 min 40 s
10 h
10 h 2 min
10 h 10 s
59 min 59 s
00:59:59

3.2 Addition, subtraction

The purpose of the second macro is to present addition or subtraction of duration, within *hms* format. Two methods are given:

- the *simple* way, with result given;
- the *compute* way, with result calculated.

```
%simple way
\simpletimeop[keys]{h1,m1,s1}{h2,m2,s2}{h3,m3,s3}

%compute way
\calctimeop[keys]{h1,m1,s1}{h2,m2,s2}
```

Available keys are:

- `zeros` : boolean for leading zeros (`false` by default);
- `type` : `+` for addition, `-` for subtraction `+` (`true` by default);
- `colsep` : length of `colsep` for columns (`1.5pt` by default);
- `find` : list of `colors` for 'finding boxes' (`empty` by default).

So:

- for the *simple way*, arguments can be given with `\boxhms` or integer values ;
- for the *compute way*, the code adapt result for hms or hm format, and `find` can be given with - fir ignoring finding items.

```
\simpletimeop{9,45,54}{4,28,57}{14,14,51}
```

$$\begin{array}{rr} & 9\,\text{h}\,45\,\text{min}\,54\,\text{s} \\ + & 4\,\text{h}\,28\,\text{min}\,57\,\text{s} \\ \hline & 14\,\text{h}\,14\,\text{min}\,51\,\text{s} \end{array}$$

```
\simpletimeop{9,45,54}{4,28,57}{\boxhms{red},\boxhms{blue},\boxhms{purple}}
```

$$\begin{array}{rr} & 9\,\text{h}\,45\,\text{min}\,54\,\text{s} \\ + & 4\,\text{h}\,28\,\text{min}\,57\,\text{s} \\ \hline & \square\,\text{h}\,\square\,\text{min}\,\square\,\text{s} \end{array}$$

```
\simpletimeop[type=-]{9,45}{4,28}{\boxhms{red},\boxhms{blue}}
```

$$\begin{array}{rr} & 9\,\text{h}\,45\,\text{min} \\ - & 4\,\text{h}\,28\,\text{min} \\ \hline & \square\,\text{h}\,\square\,\text{min} \end{array}$$

```
\calctimeop%
    [type=-]%
    {9,45,54}%
    {9,28,57}
```

$$\begin{array}{rr} & 9\ \text{h}\ 45\ \text{min}\ 54\ \text{s} \\ - & 9\ \text{h}\ 28\ \text{min}\ 57\ \text{s} \\ \hline & 0\ \text{h}\ 16\ \text{min}\ 57\ \text{s} \end{array}$$

```
\calctimeop%
    [find={blue,-,-,-,green,-,-,-,orange}]%
    {9,45,54}%
    {4,28,57}
```

$$\begin{array}{rr} & \square\ \text{h}\ 45\ \text{min}\ 54\ \text{s} \\ + & 4\ \text{h}\ \square\ \text{min}\ 57\ \text{s} \\ \hline & 14\ \text{h}\ 14\ \text{min}\ \square\ \text{s} \end{array}$$

```
{\LARGE\ttfamily\calctimeop[find={-,-,-,-,orange,teal},type=-,colsep=3pt]{9,45}{4,28}}
```

$$\begin{array}{rr} & 9\ \text{h}\ 45\ \text{min} \\ - & 4\ \text{h}\ 28\ \text{min} \\ \hline & \square\ \text{h}\ \square\ \text{min} \end{array}$$

4 The code

```
% Author        : C. Pierquet
% licence       : Released under the LaTeX Project Public License v1.3c or later, see http://www.latex-project.org/lppl.txt

\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{timeop}[2025/05/05 0.1.1 Calculates and displays arithmetic operations with durations.]

%====HISTORY
% v 0.1.1 Bugfix
% v 0.1.0 Initial version

%====OPTION
\newif\if@amsmath \@amsmathtrue
\DeclareOption{noamsmath}{\@amsmathfalse}
\DeclareOption*{}
\ProcessOptions\relax

%====BASE
\if@amsmath
  \RequirePackage{amsmath}
\fi
\RequirePackage{xstring}
\RequirePackage{xintexpr}
\RequirePackage{listofitems}
\RequirePackage{tabularray}
\RequirePackage{simplekv}
\RequirePackage{tcolorbox}
\tcbuselibrary{skins}

%====SPECIAL
\newlength\convhmsopecolsep
\NewDocumentCommand\formathms{ m }{%
  \ifboolKV[stohms]{zeros}{\xintifboolexpr{#1 < 10}{0#1}{#1}}{#1}%
}
\newtcbox\myopbox[1][black]{%
  colframe=#1,colback=white,size=fbox,boxrule=0.8pt,arc=1.2pt,boxsep=-0.8pt,top=3pt,bottom=2.2pt,%
  box align=base,nobeforeafter,opacityback=0,enhanced jigsaw%
}
\NewDocumentCommand\boxhms{ m }{%
  \myopbox[#1]{\phantom{00}}%
}

%====CONVERSION (INTERNAL)
\NewDocumentCommand\hmstos{ m O{\convtosec} }{%
  \setsepchar{,}%
  \readlist*\tmpophmsA{#1}%
  \xdef#2{\fpeval{3600*(\tmpophmsA[1])+60*(\tmpophmsA[2])+(\tmpophmsA[3])}}%
}
\NewDocumentCommand\hmtos{ m O{\convtosec} }{%
  \setsepchar{,}%
  \readlist*\tmpophmsA{#1}%
  \xdef#2{\fpeval{3600*(\tmpophmsA[1])+60*(\tmpophmsA[2])}}%
}

%====KEYS
\defKV[stohms]{%
  sys=\def\stohmssys{#1}
}
\setKVdefault[stohms]{%
  zeros=true,%
  raw=true,%
  sys=eu
}

%====MACROS
\NewDocumentCommand\stohms{ O{} m O{\convtohms} }{%
  \restoreKV[stohms]%
  \setKV[stohms]{#1}%
  \ifboolKV[stohms]{raw}%
    {%
      \xdef#3{}%
      \xdef#3{\fpeval{trunc((#2)/3600,0)},}%
      \xdef\tmpHHrest{\fpeval{(#2)-trunc((#2)/3600,0)*3600}}%
      \xdef#3{#3\fpeval{trunc((\tmpHHrest)/60,0)},\fpeval{(\tmpHHrest)-trunc((\tmpHHrest)/60,0)*60}}%
    }%
    {%
      \IfEq{\stohmssys}{eu}%
        {%
          \xdef\tmpHH{\xintfloateval{trunc((#2)/3600,0)}}%
          \xdef\tmpHHrest{\xintfloateval{(#2)-trunc((#2)/3600,0)*3600}}%
          \xdef\tmpMM{\xintfloateval{trunc((\tmpHHrest)/60,0)}}%
          \xdef\tmpSS{\xintfloateval{(\tmpHHrest)-trunc((\tmpHHrest)/60,0)*60}}%
          \xintifboolexpr{\tmpHH !=0 'and' \tmpMM != 0 'and' \tmpSS != 0}%HMS
            {\formathms{\tmpHH}\:\text{h}\:\formathms{\tmpMM}\:\text{min}\:\formathms{\tmpSS}\:\text{s}}{}%
          \xintifboolexpr{\tmpHH ==0 'and' \tmpMM != 0 'and' \tmpSS != 0}%MS
            {\formathms{\tmpMM}\:\text{min}\:\formathms{\tmpSS}\:\text{s}}{}%
          \xintifboolexpr{\tmpHH !=0 'and' \tmpMM == 0 'and' \tmpSS != 0}%HS
            {\formathms{\tmpHH}\:\text{h}\:\formathms{\tmpSS}\:\text{s}}{}%
          \xintifboolexpr{\tmpHH !=0 'and' \tmpMM != 0 'and' \tmpSS == 0}%HM
            {\formathms{\tmpHH}\:\text{h}\:\formathms{\tmpMM}\:\text{min}}{}%
          \xintifboolexpr{\tmpHH != 0 'and' \tmpMM == 0 'and' \tmpSS == 0}%H
            {\formathms{\tmpHH}\:\text{h}}{}%
          \xintifboolexpr{\tmpHH == 0 'and' \tmpMM != 0 'and' \tmpSS == 0}%M
            {\formathms{\tmpMM}\:\text{min}}{}%
          \xintifboolexpr{\tmpHH == 0 'and' \tmpMM == 0 'and' \tmpSS != 0}%S
            {\formathms{\tmpSS}\:\text{s}}{}%
        }%
        {%
          \xdef\tmpHH{\xintfloateval{trunc((#2)/3600,0)}}%
          \xdef\tmpHHrest{\xintfloateval{(#2)-trunc((#2)/3600,0)*3600}}%
```

```
          \xdef\tmpMM{\xintfloateval{trunc((\tmpHHrest)/60,0)}}%
          \xdef\tmpSS{\xintfloateval{(\tmpHHrest)-trunc((\tmpHHrest)/60,0)*60}}%
          \formathms{\tmpHH}:\formathms{\tmpMM}:\formathms{\tmpSS}%
        }%
    }%
}

\defKV[convhms]{%
  type=\def\convhmsope{#1},%
  find=\def\convhmsaffval{#1},%
  colsep=\setlength{\convhmsopecolsep}{#1}
}
\setKVdefault[convhms]{%
  zeros=false,%
  find={},%
  type=+,%
  colsep=1.5pt
}

\NewDocumentCommand\simpletimeop{ O{} m m m }{%
  \restoreKV[convhms]%
  \setKV[convhms]{#1}%
  \setsepchar{,}%
  \readlist*\tmpophmsA{#2}%
  \readlist*\tmpophmsB{#3}%
  \readlist*\tmpophmsC{#4}%
  \ifnum\tmpophmsAlen=2\relax%
    \begin{tblr}{colspec={crcrc},colsep=1pt}
      &{\tmpophmsA[1]}&h&{\tmpophmsA[2]}&min\\
      $\convhmsope$&{\tmpophmsB[1]}&h&{\tmpophmsB[2]}&min\\\hline
      &{\tmpophmsC[1]}&h&{\tmpophmsC[2]}&min\\
    \end{tblr}%
  \else%
    \begin{tblr}{colspec={crcrcrc},colsep=1pt}
      &{\tmpophmsA[1]}&h&{\tmpophmsA[2]}&min&{\tmpophmsA[3]}&s\\
      $\convhmsope$&{\tmpophmsB[1]}&h&{\tmpophmsB[2]}&min&{\tmpophmsB[3]}&s\\\hline
      &{\tmpophmsC[1]}&h&{\tmpophmsC[2]}&min&{\tmpophmsC[3]}&s\\
    \end{tblr}%
  \fi%
}

\NewDocumentCommand\intaffhmsbox{ m m }{%
  %1=\tmpophmsa
  %2=i
  \IfEq{\convhmsaffval}{}{#1}%
    {%
      \itemtomacro\tmpophmsaffvals[#2]{\tmpophcol}%
      \IfEq{\tmpophcol}{-}%
        {%
          #1%
        }%
        {%
          \boxhms{\tmpophcol}%
        }%
    }%
}

\NewDocumentCommand\calctimeop{ O{} m m }{%
  \restoreKV[convhms]%
  \setKV[convhms]{#1}%
  \setsepchar{,}%
  \readlist*\tmpophmsA{#2}%
  \ifnum\tmpophmsAlen=2%just HM
    \itemtomacro\tmpophmsA[1]\tmpophmsa%
    \itemtomacro\tmpophmsA[2]\tmpophmsb%
    \readlist*\tmpophmsB{#3}%
    \itemtomacro\tmpophmsB[1]\tmpophmsd%
    \itemtomacro\tmpophmsB[2]\tmpophmse%
    \hmtos{#2}[\tmpHeureA]%
    \hmtos{#3}[\tmpHeureB]%
    \IfEq{\convhmsope}{+}%
      {%
        \xdef\tmpCalculHeureAB{\inteval{(\tmpHeureA)+(\tmpHeureB)}}%
      }%
      {%
        \xdef\tmpCalculHeureAB{\inteval{(\tmpHeureA)-(\tmpHeureB)}}%
      }%
    \stohms{\tmpCalculHeureAB}%
    \readlist*\tmpophmsC{\convtohms}%
    \itemtomacro\tmpophmsC[1]\tmpophmsg%
    \itemtomacro\tmpophmsC[2]\tmpophmsh%
    %reading of 'findind boxes'
    \IfEq{\convhmsaffval}{}{%
      {\readlist*\tmpophmsaffvals{\convhmsaffval}}%
    %format
    \begin{tblr}{colspec={crcrc},colsep=\convhmsopecolsep}
      &
      \intaffhmsbox{\tmpophmsa}{1}%
      &
      h
      &
      \intaffhmsbox{\tmpophmsb}{2}%
      &
      min
      \\
      $\convhmsope$
      &
      \intaffhmsbox{\tmpophmsd}{3}%
      &
      h
      &
      \intaffhmsbox{\tmpophmse}{4}%
      &
```

```
      min
      \\\hline
      &
      \intaffhmsbox{\tmpophmsg}{5}%
      &
      h
      &
      \intaffhmsbox{\tmpophmsh}{6}%
      &
      min
      \\
    \end{tblr}%
  \else%HMS
    \itemtomacro\tmpophmsA[1]\tmpophmsa%
    \itemtomacro\tmpophmsA[2]\tmpophmsb%
    \itemtomacro\tmpophmsA[3]\tmpophmsc%
    \readlist*\tmpophmsB{#3}%
    \itemtomacro\tmpophmsB[1]\tmpophmsd%
    \itemtomacro\tmpophmsB[2]\tmpophmse%
    \itemtomacro\tmpophmsB[3]\tmpophmsf%
    \hmstos{#2}[\tmpHeureA]%
    \hmstos{#3}[\tmpHeureB]%
    \IfEq{\convhmsope}{+}%
      {%
        \xdef\tmpCalculHeureAB{\inteval{(\tmpHeureA)+(\tmpHeureB)}}%
      }%
      {%
        \xdef\tmpCalculHeureAB{\inteval{(\tmpHeureA)-(\tmpHeureB)}}%
      }%
    \stohms{\tmpCalculHeureAB}%
    \readlist*\tmpophmsC{\convtohms}%
    \itemtomacro\tmpophmsC[1]\tmpophmsg%
    \itemtomacro\tmpophmsC[2]\tmpophmsh%
    \itemtomacro\tmpophmsC[3]\tmpophmsi%
    %reading of 'findind boxes'
    \IfEq{\convhmsaffval}{}{}%
      {\readlist*\tmpophmsaffvals{\convhmsaffval}}%
    %format
    \begin{tblr}{colspec={crcrcrc},colsep=\convhmsopecolsep}
      &
      \intaffhmsbox{\tmpophmsa}{1}%
      &
      h
      &
      \intaffhmsbox{\tmpophmsb}{2}%
      &
      min
      &
      \intaffhmsbox{\tmpophmsc}{3}%
      &
      s
      \\
      $\convhmsope$
      &
      \intaffhmsbox{\tmpophmsd}{4}%
      &
      h
      &
      \intaffhmsbox{\tmpophmse}{5}%
      &
      min
      &
      \intaffhmsbox{\tmpophmsf}{6}%
      &
      s
      \\\hline
      &
      \intaffhmsbox{\tmpophmsg}{7}%
      &
      h
      &
      \intaffhmsbox{\tmpophmsh}{8}%
      &
      min
      &
      \intaffhmsbox{\tmpophmsi}{9}%
      &
      s\\
    \end{tblr}%
  \fi%
}

\endinput
```