Engtlc package

Version 2.0

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Contents

Chapter 1

Introduction

This package has been realised in four different periods: in the first one I wrote the symbols for units of measurement and for general symbols, in the second one I completed the part of units and I added some others symbols like impedance and admittance symbols. In the third version, in which Alessio Sanna cooperate with precious suggestions, I insered Byte and chips measures and the symbols for electrical and magnetic fields. I finished it on 18/12/2009 and on 13/01/2010 it has been published on CTAN.

In that version there were some mistakes due of my inexperience in LaTeX programming. I thank Enrico Gregorio who send me a list of them. I decided to correct them in a new version, also adding some new symbols.

The purpose to create engtlc is very simple: it can be used by all people who work in electrical or telecommunication area; infact engtlc is the abbreviation of *Engineering Telecommunications*. Where it can helps?

It helps in writing a document with LaTeX of course; in my personal experience I observed that LaTeX code isn't very friendly when you have to repeat some words in where the code is a bit different every time.

If you have to write the probability of x you can write the LaTeX code like:

```
$\mathcal{P}(x)$
```

$\mathcal{P}(x)$

If, after some times, you have to write the probability of the event A:

```
$\mathcal{P}(\text{A})$
```

$\mathcal{P}(\text{A})$

or you can copy the old code and change the argument.

With engtlc is easily; you can write:

```
$\prob{1}$
```

where `1` is the argument you have to put like x or A.

The specific news introduced by engtlc are shown in the chapter 3.

The english guide is written translating the italian one, so forgive me if there are some awful mistakes.

Chapter 2

How install engtlc

You can found the package in my website http://claudiofiandrino.altervista.org in the works section or in the official website for LaTeX packages at http://tug.ctan.org/tex-archive/macros/latex/contrib/engtlc.

Linux OS

When you have completed the dowload of *.zip* file people who use Linux OS have to copy it into the directory :

```
/usr/share/texmf/tex/latex
```

If you have saved the *.zip* file on the desktop, you have to open the terminal and digit:

```
sudo cd /home/name/Scrivania
```

Now you can copy the file with:

```
sudo cp engtlc.zip /usr/share/texmf/tex/latex/
```

After that you have to unzip it and change directory using:

```
cd /usr/share/texmf/tex/latex
```

Now you have to digit:

```
texhash
```

and engtlc is installed on your pc.

Windows OS

If you use Windows as OS and you have installed MiKTEX on your pc:

. open the *C: > Program Files > MiKTEX2.8 > tex > latex*;

. copy file engtlc.zip and unzip it into the directory;

. open *Start > MiKTEX2.8> Maintenance (Admin)> Settings*;

. it open a new window: click on *Refresh FNDB* to refresh the package database.

Now you are ready to use engtlc!!!

Chapter 3

Commands introduced by engtlc

Let's start to examine engtlc commands.

In the first section are shown commands to write unit of measurement while in the second section are enumerated several types of symbols.

3.1 Unit of measurement

I believe that write everytime the code to insert into a text units of measurement isn't fine.

Here is an example if you have to use *kbit/s*:

Code	Visualization
`\unit{kbit/s}`	kbit/s

So I decided to create a short code who can replace the longest one that must be used usually.

Engtlc units of measurement must used into `$ $`, `\[ \]` or in all *equation environment*.

Otherwise there can be problems with greek letters like `\ohm` or `\mu`. Be careful: if your in your text you use an unit you will observ this mistake:

Code	Visualization
`8 \cm e`	8 cme

So the principal use is in math environment.

Temporal measurement

Units	Equivalent code	Visualization
hours	`$\ho$`	h
seconds	`$\s$`	s
milliseconds	`$\ms$`	ms
microseconds	`$\us$`	μs
nanoseconds	`$\ns$`	ns
picoseconds	`$\ps$`	ps

Linear measures

Units	Equivalent code	Visualization
micrometres	`$\um$`	μm
millimetres	`$\mm$`	mm
centimetres	`$\cm$`	cm
decimetres	`$\dm$`	dm
metres	`$\m$`	m
kilometres	`$\km$`	km

Current measures

Units	Equivalent code	Visualization
microampere	`$\uA$`	μA
milliampere	`$\mA$`	mA
ampere	`$\A$`	A

Voltage measures

Units	Equivalent code	Visualization
microvolt	`$\uV$`	μV
millivolt	`$\mV$`	mV
volt	`$\V$`	V
megavolt	`$\MV$`	MV

Resistance measures

Units	Equivalent code	Visualization
milliohm	`$\mohm$`	mΩ
ohm	`$\ohm$`	Ω
kilohm	`$\kohm$`	kΩ
megaohm	`$\Mohm$`	MΩ

Conductive measures

Units	Equivalent code	Visualization
millisiemens	`$\mSi$`	mS
siemens	`$\Si$`	S
kilosiemens	`$\kSi$`	kS
megasiemens	`$\MSi$`	MS

Measures of capacity

Units	Equivalent code	Visualization
femtofarad	`$\fFa$`	fF
picofarad	`$\pFa$`	pF
nanofarad	`$\nFa$`	nF
microfarad	`$\uFa$`	μF
millifarad	`$\mFa$`	mF
farad	`$\Fa$`	F

Inductive measurement

Units	Equivalent code	Visualization
femtohenry	`$\fHe$`	fH
picohenry	`$\pHe$`	pH
nanohenry	`$\nHe$`	nH
microhenry	`$\uHe$`	μH
millihenry	`$\mHe$`	mH
henry	`$\He$`	H

dB mesures

Units	Equivalent code	Visualization
dB	`$\dB$`	dB
dBm	`$\dBm$`	dBm

Power measures

Units	Equivalent code	Visualization
microwatt	`$\uW$`	μW
milliwatt	`$\mW$`	mW
watt	`$\W$`	W
kilowatt	`$\kW$`	kW
megawatt	`$\MW$`	MW

Frequency measures

Units	Equivalent code	Visualization
hertz	`$\Hz$`	Hz
kilohertz	`$\kHz$`	kHz
megahertz	`$\MHz$`	MHz
terahertz	`$\THz$`	THz

Bit & chip measures

Units	Equivalent code	Visualization
bit	`$\bit$`	bit
kilobit	`$\kbit$`	kbit
megabit	`$\Mbit$`	Mbit
Byte	`$\Byte$`	Byte
kiloByte	`$\kByte$`	kByte
megaByte	`$\MByte$`	MByte
bit al secondo	`$\bits$`	bit/s
kilobit al secondo	`$\kbits$`	kbit/s
megabit al secondo	`$\Mbits$`	Mbit/s
Byte al secondo	`$\Bytes$`	Byte/s
kiloByte al secondo	`$\kBytes$`	kByte/s
megaByte al secondo	`$\MBytes$`	MByte/s
chip al secondo	`$\chips$`	chip/s
kilochip al secondo	`$\kchips$`	kchip/s
megachip al secondo	`$\Mchips$`	Mchip/s
chip su bit al secondo	`$\chipsubit$`	chip/bit

3.2 Symbols

In this section is enumerate a list of many types of symbols.

Despite the 18/12/2009 version, now there no difference in commands use in math environment and commands in text mode.

3.2.1 General symbols

Comando di fine esercizio

The command of end exercice puts a black square on the right of the page.

Code	Visualization
`$\finees$`	■

Right implies command

Command for a right implies symbol: it is very similar to `\implies`, but it puts before and after the symbol a space who can be choose by the user with the argument.

Code	Visualization
`$\frecciadex{1}$`	$\frecciadex{1}$

Down implies command

Code	Visualization
`$\frecciadown$`	$\frecciadown$

White noise command

Code	Visualization
`\varianzarumore`	$\varianzarumore$

Fourier Transform

Command for the Fourier transform of x.

Code	Visualization
`\fourier{x}`	$\fourier{x}$

Inverse Fourier Transform

This command is very similar to the last one.

Code	Visualization
`\invfourier{x}`	$\invfourier{x}$

Real part

Code	Visualization
`\partereale{x}`	$\partereale{x}$

Imaginary part

Code	Visualization
`\parteimm{x}`	$\parteimm{x}$

Probability

To write the probability of A:

Code	Visualization
`\prob{\text{A}}`	$\mathcal{P}\left(\mathrm{A}\right)$

Piece of information

Code	Visualization
`\Info{x}`	$I\left(x\right)$

Command versore

Code	Visualization
`\versore{x}`	$\hat{x}$

Arrow

Code	Visualization
`\vettore{x}`	$\overrightarrow{x}$

Cosine

Code	Visualization
`\coseno{f_0}`	$\cos\left(2\pi f_0 t\right)$

Sine

Code	Visualization
`\seno{f_0}`	$\sin\left(2\pi f_0 t\right)$

Energy

Code	Visualization
`\energia{m}`	$\mathcal{E}_m$

Module

Code	Visualization
`\modulo{x}`	$\|x\|$

Module with exponent

Code	Visualization
`\moduloexp{x}{2}`	$\|x\|^2$

Command to write something in dB

Code	Visualization
`$\indB{\dfrac{C}{I}}$`	$\left.\dfrac{C}{I}\right\|_{\text{dB}}$

Maximum

Code	Visualization
`\massimo{x}`	$\max\{x\}$

Minimum

Code	Visualization
`\minimo{x}`	$\min\{x\}$

Speed of light

Code	Visualization
`$\valc$`	$3 \cdot 10^8$

Logarithm

Code	Visualization
`\loga{2}{x}`	$\log_2 x$

Analitic signal

Code	Visualization
`\analitic{x}`	$\mathring{x}$
`\analitic{v}`	$\mathring{v}$

Integral

An integral on the all domain:

Code	Visualization
`\intinf{x\,dx}`	$\int_{-\infty}^{+\infty} x\,dx$

Delta

Code	Visualization
`\deltain{x}`	$\delta\left(x\right)$

3.2.2 Gamma symbols

The symbol used in electrical and magnetic fields courses is well characterized; if you want to use it without indicating the point there are:

Code	Visualization
`\gammatens`	${}^{\mathrm{V}}\Gamma$
`\gammacorr`	${}^{\mathrm{I}}\Gamma$

When you have to insert the specific point:

Code	Visualization
`\gammatensin{A}`	${}^{\mathrm{V}}\Gamma_{\mathrm{A}}$
`\gammacorrin{A}`	${}^{\mathrm{I}}\Gamma_{\mathrm{A}}$

The voltage gamma can be express with:

Code	Visualization
`\gammain{A}`	Γ_{A}

The Kurokawa Gamma:

Code	Visualization
`\gammak`	${}^{\mathrm{k}}\Gamma$

Here are some examples who show very well how engtlc is useful:

1. Code
   `\moduloexp{\gammak}{2}`
   Visualization
   $\left|{}^{\mathrm{k}}\Gamma\right|^2$

2. Code
   `\partereale{\fourier{\moduloexp{x}{2}}}`
   Visualization
   $\mathbf{Re}\{\mathcal{F}\{|x|^2\}\}$

   The standard code to write the expression up is:

```
$\textbf{Re}\left\lbrace \mathcal{F}\left\lbrace
\left\vert x \right\vert^{2} \right\rbrace \right\rbrace$
```

3.2.3 λ symbols

There are three different types of symbols:

In the open space

Code	Visualization
`$\lbvt$`	λ_0

In a guide 1

Code	Visualization
`$\lbg$`	λ_g

In a guide 2

Code	Visualization
`$\lbgvt$`	λ_{g_0}

3.2.4 Impedance & Admittance symbols

With engtlc you can also write all types of impedance and admittance.

Generic impedance and admittance

To exprime an impedance or an admittance in a specific point, as A:

Code	Visualization
`\z{A}`	Z_A
`\y{A}`	Y_A

To characterize an impedance or an admittance normalized in a specific point, as A:

Code	Visualization
`\znorm{A}`	ζ_A
`\ynorm{A}`	y_A

Characteristic impedance and admittance

To write the symbol for characteristic impedance and admittance you have to use:

Code	Visualization
`\zinf`	Z_∞
`\yinf`	Y_∞

If in a guide there are more than one there is a command very similar to the last one, but it has a final `-n`, in order to enumerate them; for example if there are 2:

Code	Visualization
`\zinfn{2}`	$\mathrm{Z}_{\infty 2}$
`\yinfn{2}`	$\mathrm{Y}_{\infty 2}$

To avoid confusion be careful when you want to use the numbered impedance and not numbered impedance; here is an example when the final `-n` is not written:

Generic Impedance Code	Visualization
`\zinf{2}`	$\mathrm{Z}_\infty 2$

Numbered Impedance Code	Visualization
`\zinfn{2}`	$\mathrm{Z}_{\infty 2}$

The first code is not wrong, but the final output will not be the expected one.

With engtlc is possible also write impedance and admittance in the open space:

Code	Visualization
`\zvt`	Z_0
`\yvt`	Y_0

Here is an example who shown several engtlc commands.

With engtlc commands the avaible power can be written as:

code: `\[\potdisp=\frac{\moduloexp{V}{2}}{\partereale{4\cdot\z{G}}}\]`

visualization:

$$P_{\mathrm{disp}} = \frac{|V|^2}{\mathbf{Re}\{4 \cdot \mathrm{Z}_G\}}$$

Without engtlc commands the code is:

```
\[P_{disp}=\frac{\left| V \right|^2}
{\textbf{Re}\left\lbrace {4\cdot\text{Z}_{G}}\right\rbrace}\]
```

3.2.5 Power symbols

Symbols to characterize the power are well defined.

Power in a point

To write the power in a specific point, for example A:

Code	Visualization
`\potin{A}`	P_A

Available Power

Code	Visualization
`\potdisp`	P_{disp}

Power supply

Code	Visualization
`\potalim`	P_{alim}

Radiation Power

Code	Visualization
`\potirr`	P_{irr}

Dissipated Power

Code	Visualization
`\potdiss`	P_{diss}

Power of incidence

Code	Visualization
`\potinc`	P_{inc}

3.2.6 Electrical & magnetic fields symbols

As regards electrical and magnetic fields, engtlc commands are not well defined.
I only introduce:

. electrical and magnetic field in function of $\overrightarrow{r}$ and the time;

. fasori di campo elettrico e mangnetico.

In electrical and magnetic fields courses as $\overrightarrow{r}$ is introduced the symbol $\underline{r}$.

Code	Visualization
`\campoe`	$\underline{\mathcal{E}}(\underline{r},t)$
`\campoh`	$\underline{\mathcal{H}}(\underline{r},t)$

Code	Visualization
`\campoefas`	$\underline{\mathrm{E}}(\underline{r})$
`\campohfas`	$\underline{\mathrm{H}}(\underline{r})$

Chapter 4

LPPL Licence

Engtlc is distributed under LPPL Licence: LaTeX Project Public Licence.

```
%% engtlc.dtx
%% Copyright 2010 Fiandrino Claudio
%
%  This work may be distributed and/or modified under the
%  conditions of the LaTeX Project Public License, either version 1.3
%  of this license or (at your option) any later version.
%  The latest version of this license is in
%  http://www.latex-project.org/lppl.txt
%  and version 1.3 or later is part of all distributions of LaTeX
%  version 2005/12/01 or later.
%
%  This work has the LPPL maintenance status ‘maintained’.
%
%  The Current Maintainer of this work is Fiandrino Claudio.
%
%  This work consists of the files engtlc.dtx and pig.ins
%  and the derived file engtlc.sty.
```