

# CALCTAB package

## version 0.6

Roberto Giacomelli  
e-mail: `giaconet at tin dot it`

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*“The table computes the sum  
not because is useful,  
but because the result  
is not an user essential data”*

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# 1 Introduction

The `calctab` package helps user to typeset a kind of economic table such as invoices, expence notes and liquidation, or other tabular material with numeric columns.

A normal `tabular` environment works well but force user to *think* in a generic  $\text{\LaTeX}$  language to reference the object of his work and without a conceptual relation among these. In addition a lot of formatting commands takes the same relevance of the main user data.

Economic items maybe are independent values or not like sums and percentages on previous values. The language must be expressive concerning together data and its relations. So, the priority is to add a new language element.

## 2 User manual

In this section will be explain the use of the two `CALCTAB` environments `calctab` and `xcalctab`, first through several examples and then showing its formal syntax.

### 2.1 `calctab` and `xcalctab` by examples

#### 2.1.1 A simple table

Well, starting with a simple case, consider a list of three entries, a 10% tax apply on it, and the final sum as showed in the next table:

	Items description	€
A	First cost	12 500,90
B	Second cost	8 560,03
C	Third cost	9 200,45
D	Tax (10,00% on A+B+C)	3 026,14
	<b>Total cost (A+B+C+D)</b>	<b>33 287,52</b>

The user can typesetting the example table with the followed code (obviously, the directive `\usepackage{calctab}` must be present in the document preamble).

```
% in the document preamble
\usepackage{calctab}
```

```
1 % in the document body
2 \begin{calctab}
3   \amount{First cost}{12500,9}
4   \amount{Second cost}{8560,03}
5   \amount{Third cost}{9200,45}
6   \perc{Tax}{10}
7   \add{Total cost}
8 \end{calctab}
```

The behaviour of the inner commands is based on these main rules:

- Each command typeset one table row;
- the sequence of commands produce the sequence of the table rows;
- the `\perc` and the `\add` commands computes all previous values (with exception to the `\add` row);
- optional command argument provides a relation row language to select item or groups of items.

An independent value is not only a numeric data but also it's defined by a description text. This concept is directly express by the `\amount` command which needs two mandatory arguments: the *description text* and the item *economic consistency*.

No more different is a percentage object structure with its description text and a numeric value this time not an absolute number but a factor multiply by one hundred calculate on some previous data, and still we can easy express this with the `\perc` command.

Finally, we encountered a sum that only needs a description text. The *calctab* language provides the `\add` command to cover this concept.

These three commands are available in an environment called *calctab* that represents the comprehensive structure of a table.

The code implementation of the inner commands computes the numeric results with the floating point algorithm rounded it with a max of two decimal digit (currently the results are truncated at this fixed precision). The number of the commands mandatory argument can be negative.

The *calctab* environment manages all the table format elements such as the rows color, the rules, the columns header description text, etc. Furthermore, the code executes the data numeric formatting, the font family selection and more.

For example, to the rows description text the `\add` and `\perc` commands adds a list of uppercase alphabetical character to explicate the computed rows.

Potentially all of these *visual* property could be adjust by the *calctab* user.

### 2.1.2 Quantity and price columns

The *calctab* package provides another environment called *xcalctab* where the *x* character suggests a multiply operation and an extension of the base *calctab* too. The inner commands are the same already discussed except the `\amount` command that accepts the description test and two numbers indeed only one.

The final table will appears with three columns typesetting with the two numeric arguments and their product. The next table clarify this structure:

	Items description	Q.ty	Price	€
A	Newspapers	3,00	1,30	3,90
B	Coloured pencils	12,00	6,00	72,00
C	Maths exercise book	6,00	2,50	15,00
D	Compass	1,00	9,90	9,90
E	Ruler	1,00	5,90	5,90
F	Protractor	1,00	6,80	6,80
G	Deduction (−5,00% on A+B+⋯+F)			−5,68
<b>Total (A+B+⋯+G)</b>				<b>107,82</b>

```

1 \begin{xcalctab}
2   \amount{Newspapers}{3}{1,30}
3   \amount{Coloured pencils}{12}{6,00}
4   \amount{Maths exercise book}{6}{2,50}
5   \amount{Compass}{1}{9,90}
6   \amount{Ruler}{1}{5,90}
7   \amount{Protractor}{1}{6,80}
8   \perc{Deduction}{-5}
9   \add{Total}
10 \end{xcalctab}

```

The help text  $A+B+C+D+\dots+\langle LAST \rangle$ , will be shorted when the items are more than *five* elements, in  $A+B+\dots+\langle LAST \rangle$ . The abbreviation condition is true only if the items in the subgroup are a consecutive sequence.

### 2.1.3 Items relations

If more complex tables require *relational* information between rows is necessary to assign to it a names and recall these identifier in a list. This simply way can be achieved with the command optional argument.

A name can be assign to a table row by using the `id` key (a significance name improve code clarity). The syntax is based to  $\langle key \rangle = \langle value \rangle$  assignment, where key is fixed `id` string. Later on, compute sum or percentage only on a subset of previous *calctab* items, can get recall in a comma separated list, the user row name.

The next example show the command optional argument at work. For example, we want to apply a different discount on each expense or on each group of expense.

	Items description	€
A	Five dinner	146,00
B	Five breakfast	35,00
C	Discount (-8,00% on A)	-11,68
D	Discount (-4,00% on B)	-1,40
<b>Grand total (A+B+C+D)</b>		<b>167,92</b>

The next  $\text{\LaTeX}$  code explains language support to the rows relation by naming :

```

1 \begin{calctab}
2   \amount[id=dinner]    {Five dinner}{146}
3   \amount[id=breakfast]{Five breakfast}{35}
4   \perc[dinner]        {Discount}{-8}
5   \perc[breakfast]{Discount}{-4}
6   \add{Grand total}
7 \end{calctab}
```

### 2.1.4 Subtotals

To the table of the last example we will add a subtotal as the sum of the discounts row.

Hotel bill:

Period from 12 october 2008 to 18 october 2008  
(room 456)

	Items description	€
A	Five dinner (29,20 $\times$ 5,00)	146,00
B	Five breakfast (7,00 $\times$ 5,00)	35,00
C	Discount (-8,00% on A)	-11,68
D	Discount (-4,00% on B)	-1,40
<b>Total of discount (C+D)</b>		<b>-13,08</b>
<b>Grand total (A+B+C+D)</b>		<b>167,92</b>

```

1 \begin{calctab}[Hotel bill:\\
2   Period from 12 october 2008 to 18 october 2008 (room 456)]
3   \amount[id=dinner]      {Five dinner}  {29,2 * 5}
4   \amount[id=breakfast]  {Five breakfast}{ 7 * 5}
5   \perc[id=dis8,dinner]  {Discount}      { -8}
6   \perc[id=dis4,breakfast]{Discount}     { -4}
7   \add[dis8,dis4]        {Total of discount}
8   \add                   {Grand total}
9 \end{calctab}
```

As the reader can be notice, the optional *table description* is typeset as a paragraph having the same (variable) table width.

Table 1: calctab \amount command optional binary operation

Floating point operation	Symbolic description	Numeric example
<i>Addition</i>	$-\langle a \rangle + \langle b \rangle$	$-15,20 + 41$
<i>Subtraction</i>	$\langle a \rangle - \langle b \rangle$	$15,20 - 41$
<i>Subtraction</i>	$-\langle a \rangle - \langle b \rangle$	$-15,20 - 41$
<i>Multiplication</i>	$\langle a \rangle \cdot \langle b \rangle$	$15,20 \cdot 41$
<i>Multiplication</i>	$-\langle a \rangle \cdot -\langle b \rangle$	$-15,20 \cdot -41$
<i>Division</i>	$\langle a \rangle / \langle b \rangle$	$15,20/41$
<i>Division</i>	$-\langle a \rangle / \langle b \rangle$	$-15,20/41$

### 2.1.5 An arithmetic argument

The last example silently uses a feature of the \amount command (only for calctab and not for xcalctab) available from the package version 0.6. The numeric argument can optionally be a binary math expression. The parse algorithm is very simple and the only syntax allowed are show in Tab. 1 where  $\langle a \rangle$  and  $\langle b \rangle$  are two decimal numbers.

Sometimes the applied round off number must be show in the table. This is possible because the code report the input user operation. Here is an example.

Items description	€
A A rounded cost (4 506,00 – 6,00)	4 500,00
B Positive rounded cost (3 598,30 + 1,70)	3 600,00
<b>Total (rounded) (A+B)</b>	<b>8 100,00</b>

```

1 \begin{calctab}
2   \amount{A rounded cost}{4506-6}
3   \amount{Positive rounded cost}{3598,30+1,70}
4   \add{Total (rounded)}
5 \end{calctab}

```

### 2.1.6 Sum of the sums

In this table a 20% deduction amount must be apply on the total of the first three values. A solution is to assign a name for each rows and write its list in optional argument of \perc command. Nevertheless, this sum is just computed in previus row, thus we can assign a name only to this table row \add[id=total]{Total amount of the design task}, and later recall the result and then apply percentage on it with the line \perc[total]{Deduction}{-20}.

Plant project Fee Note:  
Italian restaurant and pizzeria “La Margherita”

Items description	€
A Design of the air conditioned plant	5 400,00
B Design of the electric plant and video surveillance	8 000,00
C General expence (8,55% on A+B)	1 145,70
<b>Total amount of the design task (A+B+C)</b>	<b>14 545,70</b>
D Tax (2,00% on A+B+C)	290,91
E VAT (20,00% on A+B+C+D)	2 967,32
F Deduction (–20,00% on A+B+C)	–2 909,14
<b>Total (A+B+...+F)</b>	<b>14 894,79</b>

The complete code is showed here:

```

1 \begin{calctab}[Plant project Fee Note:\\
2   Italian restaurant and pizzeria ‘‘La Margherita’’]
3   \amount{Design of the air conditioned plant}{5400}
4   \amount{Design of the electric plant and video surveillance}{8000}
5   \perc{General expence}{8,55}
6   \add[id=total]{Total amount of design task}
7   \perc{Tax}{2}
8   \perc{TVA}{20}
9   \perc[total]{Deduction}{-20}
10  \add{Total}
11 \end{calctab}

```

### 2.1.7 Interval rows selection

In an independent values list the idea of interval selection is simply an identification of consecutive elements. So we only need to specify the first and the last group delimiters rows of the series. If the first element is not an explicit information the element one becomes default and, similary, the last element of whole dataset becomes the upper limit if this is not available.

The CALCTAB commands `\perc` and `\add` supports an interval selection with `from` and `until` keys that referenced row name. For example in this follow table the first five items and the last four are two separated groups.

The interval selection table

Items description		€
A	One	100 000 000,00
B	Two	20 000 000,00
C	Three	3 000 000,00
D	Four	400 000,00
E	Five	50 000,00
F	Six	6 000,00
G	Seven	700,00
H	Eight	80,00
I	Nine	9,00
<b>From one to five (A+B+C+D+E)</b>		<b>123 450 000,00</b>
<b>From six to nine (F+G+H+I)</b>		<b>6 789,00</b>
<b>As well as total (A+B+...+I)</b>		<b>123 456 789,00</b>

```

1 \begin{calctab}[The interval selection table]
2   \amount      {One}{100000000}
3   \amount      {Two}{20000000}
4   \amount      {Three}{3000000}
5   \amount      {Four}{400000}
6   \amount[id=five]{Five}{50000}
7   \inrule
8   \amount[id=six] {Six}{6000}
9   \amount      {Seven}{700}
10  \amount      {Eight}{80}
11  \amount      {Nine}{9}
12  \add[until=five]{From one to five}
13  \add[from=six]{From six to nine}
14  \add{As well as total}
15 \end{calctab}

```

An inner rule is adding *manually* with the command `\inrule` (that just sounds *inner rule*).

Is possible to combine the key `until` with the key `from` in the same optional argument to select a whole inner interval, and a row name list too. In case of a selection overlap, a package warning will be throws at compile time.

## 2.2 Environments formal syntax

### 2.2.1 calctab syntax

The `calctab` environment syntax will be described in succession:

```
\begin{calctab}[\langle description paragraph \rangle]
  \langle calctab commands list \rangle
\end{calctab}
```

The `\langle calctab commands list \rangle` is a sequence of the internal commands `\amount`, `\perc`, `\add` and `\inrule`.

```
\amount[\langle key-value list \rangle]{\langle description \rangle}{\langle value \rangle}
```

`\langle key-value list \rangle = id=\langle rowID \rangle;`

`\langle description \rangle =` Text line;

`\langle value \rangle = \langle decimal value \rangle` or `\langle basic binary operation \rangle`.

```
\perc[\langle key-value list \rangle]{\langle description \rangle}{\langle percentage \rangle}
```

`\langle key-value list \rangle = id=\langle rowID \rangle, from=\langle rowID \rangle, until=\langle rowID \rangle, \langle rowID list \rangle;`

`\langle description \rangle =` Text line;

`\langle value \rangle = \langle percentage decimal value \rangle`.

```
\add[\langle key-value list \rangle]{\langle description \rangle}
```

`\langle key-value list \rangle = id=\langle rowID \rangle, from=\langle rowID \rangle, until=\langle rowID \rangle, \langle rowID list \rangle;`

`\langle description \rangle =` Text line.

```
\inrule
```

### 2.2.2 xcalctab syntax

The `xcalctab` environment syntax will be described in the next paragraph:

```
\begin{xcalctab}[\langle description paragraph \rangle]
  \langle xcalctab commands list \rangle
\end{xcalctab}
```

The `\langle xcalctab commands list \rangle` is a sequence of the internal commands `\amount`, `\perc`, `\add` and `\inrule`.

```
\amount[\langle key-value list \rangle]{\langle description \rangle}{\langle value1 \rangle}{\langle value2 \rangle}
```

`\langle key-value list \rangle = id=\langle rowID \rangle;`

`\langle description \rangle =` Text line;

`\langle value1 \rangle = \langle decimal value \rangle;`

`\langle value2 \rangle = \langle decimal value \rangle`.

```
\perc[\langle key-value list \rangle]{\langle description \rangle}{\langle percentage \rangle}
```

$\langle key\text{-}value\ list \rangle = id=\langle rowID \rangle, from=\langle rowID \rangle, until=\langle rowID \rangle, \langle rowID\ list \rangle;$   
 $\langle description \rangle = \text{Text line};$   
 $\langle value \rangle = \langle percentage\ decimal\ value \rangle.$

`\add[ $\langle key\text{-}value\ list \rangle$ ]{ $\langle description \rangle$ }`

$\langle key\text{-}value\ list \rangle = id=\langle rowID \rangle, from=\langle rowID \rangle, until=\langle rowID \rangle, \langle rowID\ list \rangle;$   
 $\langle description \rangle = \text{Text line}.$

`\inrule`

Please note that the `calctab` and `xcalctab` environments are based on the standard L<sup>A</sup>T<sub>E</sub>X `tabular` environment, so you can manage your table as a float object all-surrounding it with a `table` environment.

### 2.3 The table appearance commands (at the moment)

The first row of the table typeset by `calctab` environment contains a pair of texts. The title of description column, that can be modify by the user with the command `\ctdescription`, and the title of economic column that describe currency, set by the command `\ctcurrency`. Default values are “Items description” and `\euro`.

These command save the argument in defined internal macro, in the same way of the common `\title` and `\author` command of the `article` class. Insert these commands before the `calctab` environment to change it.

`\ctcurrency{ $\langle user\ text \rangle$ }`

`\ctdescription{ $\langle user\ text \rangle$ }`

A table example show explicit assignment of the description text and currency unit after this commands:

```
1 \ctdescription{Your bill, thanks a lot.}
2 \ctcurrency{USD}
```

	Your bill, thanks a lot.	USD
A	Five dinner	146,00
B	Five breakfast	35,00
C	Discount (−8,00% on A)	−11,68
D	Discount (−4,00% on B)	−1,40
<b>Grand total (A+B+C+D)</b>		<b>167,92</b>

The default english text in percentage row can be changed in the same way with the command `\ctontranslation`

`\ctontranslation{ $\langle on\ traslation \rangle$ }`

and the headers of the two `xcalctab` numeric columns can be setting with

`\ctheaderone{ $\langle first\ col\ text\ header \rangle$ }` `\ctheadertwo{ $\langle second\ col\ text\ header \rangle$ }`

### 2.4 Increment the table width

The width of the `CALCTAB` table can be adjust via a standard L<sup>A</sup>T<sub>E</sub>X length called `\ctsep` (default value is 8mm). The horizontal space will be add to the central column of the table. The next line is an example:

`\setlength{\ctsep}{28pt}`



### 3 CALCTAB idea

The language efficacy is particularly important for the L<sup>A</sup>T<sub>E</sub>X user. The CALCTAB underline concept is to build an expressive language for the model – view paradigm.

So one *model* of structured data, can have more and more presentation *view*. For example, a text with tabular structure can became a report or a graphic plot image.

### 4 ToDo

A big work remain to do until the release 1.0 version: a language design and implementation too of a new user interface that make easy modify the view parameter of the table such as the type of label row (number, letter and so on), or to define the description text in the header column.

This list report tasks:

- write in good english the package documentation;
- internationalization of the fixed text in table and the currency unit;
- data input and inner commands language development;
- new infrastructure to manage the table view property;
- ...

### 5 Package License

This work may be distributed and/or modified under the conditions of the L<sup>A</sup>T<sub>E</sub>X Project Public License, either version 1.3 of this license or 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 L<sup>A</sup>T<sub>E</sub>X version 2005/12/01 or later.

### 6 Thanks and acknowledgments

The enthusiasm raised during GuIT*meeting*2008 in Pisa (Italy)<sup>1</sup> by the talk “*Una tabella che fa calcoli*” and the tip suggest me by Norbert Preining (Vienna University of Technology) to upload on CTAN the code in experimental section, finally persuade me to publish this work.

Thanks GuIT*meeting*2008 people, thanks Norbert.

Thanks a lot to Professor Enrico Gregorio for help me to resolve some code problem: balance the table description paragraph width to the table variable width, save in a tokens registry the material of table so as over the implicit group barrier of the tabular cells, and solve consequent `\expandafter jungle`.

Thanks a lot to the authors of packages used by `calctab`.

And finally, thanks to my family.

Every comment are welcome as well as any language discussion, so don't esitate to send to the author an e-mail message with your opinion, suggestion or desiderata. Thank you.

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<sup>1</sup>For information please visit the site [www.guit.sssup.it/guitmeeting/2008/2008.it.php](http://www.guit.sssup.it/guitmeeting/2008/2008.it.php)

## 7 Change history

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Number	Date	Improvement description
0.5	2009/02/23	first CALCTAB CTAN release
0.6.1	2009/03/03	New <code>\inrule</code> command to manual draw a rule among the table rows
0.6.2	2009/03/03	Fixed bug: the absense of a rule after an add row
0.6.3	2009/03/05	New <code>xcalctab</code> environment (extended environment with the “quantity” and “price” columns)
0.6.4	2009/03/10	New feature: automatic short of the description string ( $A+B+C+\dots$ ) if it’s long than more five items
0.6.5	2009/03/10	Substituted the standard $\text{\LaTeX}$ command <code>\Alph</code> with <code>\AlphAlph</code> by Heiko Oberdiek to eliminate the 26 rows limit in label column
0.6.6	2009/03/12	New feature for <code>\amount</code> command: basic binary operation with two numbers thanks to <code>xstring</code> package
0.6.7	2009/03/12	Some minor internal code adjustments

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