The tablists package*

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Abstract

This package gives variant of environment for creating of list of short items in the way of tabular alignment. That could be useful for list of exercises in math educational literature. It allows to build one-level and two-level tabulated lists.

Contents

*This file has version number v0.0e, last revised 2009/08/04.

1 Building Commands

tabenum
\tabenumitem
\item

The `tabenum` environment prints short items aligned in columns.

Each item starts with `\tabenumitem` command. First example of `tabenum` list—please note that you may set optional argument in the same way as in modified environments from enumerate or paralist packages:

```
\begin{tabenum}[\bfseries1)]%
\tabenumitem
$z=\displaystyle\frac xy$;
\tabenumitem
$2^x=9;$\cr

\tabenumitem
$3^{2x+3}=16 $;
\tabenumitem
$z=2x^2+4y^2$;\par
\tabenumitem
$u=\sqrt{x^2+y^2+z^2}$;
\tabenumitem
$v=gt+\displaystyle\frac{g}{4}t$;\\[1ex]
\tabenumitem
$u=2^{5x-3y+z}$;
\tabenumitem
$w=(v+7)^2+(u-3)^2$;


\tabenumitem
$5^x=\displaystyle\frac{4}{3} ;$
\tabenumitem
$z=(x+1)^2+y^2$;\\*
\tabenumitem
$2+5+8+ \ldots +(3n+2)=155$, $n\in \mathrm{N};$
\tabenumitem
$t=5u^2+8v^2$;
\end{tabenum}
```

1) $z=\dfrac{x}{y}$;

2) $2^x=9$;

3) $3^{2x+3}=4$;

4) $z=2x^2+4y^2$;

5) $u=\sqrt{x^2+y^2+z^2}$;

6) $v=gt+\dfrac{g}{4}t$;

7) $u=2^{5x-3y+z}$;

8) $w=(v+7)^2+(u-3)^2$;

9) $5^x=\dfrac{4}{3}$;

10) $z=(x+1)^2+y^2$;

11) $2+5+8+\ldots+(3n+2)=155$, $n\in\mathrm{N}$;

12) $t=5u^2+8v^2$;

You may see that empty line (or \par command), \\ command and \cr do the same: start a new row. The \\ macro works like in array environment and allows optional argument with vertical correction. (Also the * command suppresses breaking between pages, see next example.)

Please note that two or more \par's \cr's or \\'s (and also any combination of these three commands) create additional empty lines.

You may use the \item macro instead of \tabenumitem in this tabenum environments (see next examples).

\notabenumitem
\noitem
\skipitem

On the next step you can wish to do the list like before more compact. The \multicolumn does not work here correctly[1]. At first you may use plain TEX's command \hidewidth to hide width of widest column entry; then you may use other variant of \tabenumitem(\item) command—\notabenumitem(\noitem)—this command increases list entry, but does not create a new column; third command \skipitem allows you to skip one tabenum column[2]. Next example show usage of these three commands:

```
\begin{tabenum}[\bfseries1)]%
\item
$z=\displaystyle\frac xy$;
\noitem
$2^x=9;$
\item
$3^{2x+3}=4 $.
\item
$z=2x^2+4y^2$;\nopagebreak

\item
$u=\sqrt{x^2+y^2+z^2}$;
\item
$v=gt+\displaystyle\frac{g}{4}t$,
\item
$u=2^{5x-3y+z}$.\cr
\item
$w=(v+7)^2+(u-3)^2$;
\item
$5^x=\displaystyle\frac{4}{3} ;$
\item
$z=(x+1)^2+y^2$;\\*
\item
$2+5+8+ \ldots +(3n+2)=155$,
   $n\in \mathrm{N};$\hidewidth\skipitem
\item
$t=5u^2+8v^2$;
\end{tabenum}
```

[1] Also the plain TEX's commands like \omit and \span/\multispan commands, I think, need too complex code.

[2] The tabenum column includes two columns: it works like rl columns in tabular environment. Thus, \skipitem equals to && combination.

1) $z = \frac{x}{y}$; **2)** $2^x = 9$; **3)** $3^{2x+3} = 4$. **4)** $z = 2x^2 + 4y^2$;

5) $u = \sqrt{x^2 + y^2 + z^2}$; **6)** $v = gt + \frac{g}{4}t$, **7)** $u = 2^{5x-3y+z}$.

8) $w = (v+7)^2 + (u-3)^2$; **9)** $5^x = \frac{4}{3}$; **10)** $z = (x+1)^2 + y^2$;

11) $2+5+8+\ldots+(3n+2) = 155$, $n \in \mathrm{N}$; **12)** $t = 5u^2 + 8v^2$;

The items 1 and 2 were joined in one column: the item 2 used `\noitem` (`\notabenumitem`) command. The item 11 occupies two columns, so it uses the `\hidewidth` (hides item width) and `\skipitem` (skips column of next item) commands.

1.1 Spacing

Vertical spaces around tabulated list are equal to the list ones `\topsep+\partopsep`.

Space between rows depends on the `\jot` value, like in amsmath environments like `align`, gather etc.

`\tabenumsep` The horizontal spacing between items of list. It defined like:

```
\renewcommand\tabenumsep{\hskip1em}
```

The `\labelsep` parameter is used after item number.

`\tabenumindent` The `\tabenumindent` command sets left margin of `tabenum` environment. It can be defined like horizontal space/skip or text, for example:

```
\renewcommand\tabenumindent{\hskip\parindent}
```

or

```
\renewcommand\tabenumindent{Word }
```

That could be useful also inside, e.g., a proper list environments like `enumerate` or `itemise` for corrections of left margins.

1.2 The `tabenum` environment inside a proper list

The version 0.0e of tablists package enlarges left margin of `tabenum`, when environment appears inside proper list, by the value of left margin of this list. Sometimes left edges of `tabenum` labels and list labels of the same level are not aligned correctly (it happens when `\labelwidth` value is not equal to the natural width of labels). In these cases you may define the correction skip with the `\tabenumindent` command.

Also the version 0.0e loads labels of empty items of upper/outer list at the left side of the first item of `tabenum` automatically. It follows mechanism similar to building of empty items in list environment. (Empty items of LaTeX list are consecutively stored to special box register and printed out at the beginning when the list text appears; the same happens at the beginning of `tabenum` environment: this box, if not empty, is printed at the left of first `tabenum` item.)

```
\begin{enumerate}[\bfseries1)]%
```

```
\item
\begin{tabenum}[a)]%
...
```

1) a) $z=\dfrac{x}{y}$; b) $2^x=9$; c) $3^{2x+3}=4$. d) $z=2x^2+4y^2$;
e) $u=\sqrt{x^2+y^2+z^2}$; f) $v=gt+\dfrac{g}{4}t$, g) $u=2^{5x-3y+z}$.
h) $w=(v+7)^2+(u-3)^2$; i) $5^x=\dfrac{4}{3}$; j) $z=(x+1)^2+y^2$;
k) $2+5+8+\ldots+(3n+2)=155$, $n\in\mathrm{N}$; l) $t=5u^2+8v^2$.

Please note that for the case of `tabenum` environment inside list, there is not compatibility between version 0.0e and earlier versions—left margin of `tabenum` is changed (mechanism of placing empty list items on one baseline using compensating vertical spaces could work but its calculation was changed, see also next paragraph).

`\liststrut` In versions until 0.0d there was offered the `\liststrut` command in the cases when needed to put empty list item on the same line with first item of `tabenum`. The command raises first line of next text block at the baseline of previous. (Without any option it puts negative baselineskip. If there is a high element (any math sentence) in the first line of next text, it must be written in option without `$`'s, the height of this argument is used for compensating skips argument.) Since this command must take into account various vertical skips, which appear at the start of new item and also height of printing text, the adjusting of baselines does not always work correctly.

1.3 The `subtabenum` environment: second level, variant I

`subtabenum` The second level of equations/exersizes list `subtabenum` based on `tabular` environment.

```
\begin{tabenum}[\bfseries 1)]%
\item
\begin{subtabenum}[a)]%
\item
$z=\displaystyle\frac xy$;
\noitem
$2^x=9;$
\item
$3^{2x+3}=4 $.
\item
$z=2x^2+4y^2$;
\end{subtabenum}

\item
\begin{subtabenum}[a)]%
\item
$u=\sqrt{x^2+y^2+z^2}$;
\item
...
```

```
\end{subtabenum}
\end{tabenum}
```

1) a) $z=\frac{x}{y}$; b) $2^x=9$; c) $3^{2x+3}=4$. d) $z=2x^2+4y^2$;

2) a) $u=\sqrt{x^2+y^2+z^2}$; b) $v=gt+\frac{g}{4}t$, c) $u=2^{5x-3y+z}$.

d) $w=(v+7)^2+(u-3)^2$; e) $5^x=\frac{4}{3}$; f) $z=(x+1)^2+y^2$;

g) $2+5+8+\ldots+(3n+2)=155$, $n\in$ N; h) $t=5u^2+8v^2$;

Please note that `\hidewidth` skip is followed by the `\strut` command inside `subtabenum` environment: the skips at the "edges" of `tabular` columns or before `\\` command doesn't work.

1.4 The `\subtabenumitem`/`\subitem` macros: second level, variant II

The previous example shows that columns were destroyed from one `subtabenum` environment to another. Also the rows of sublist cannot break between pages.

`\subtabenumitem` `\subitem`

There is another variant for two-level tabulated list. If you use second option in `tabenum` environment, you may use `\subtabenumitem`/`\subitem` commands for the second level[3].

If you put `\subtabenumitem` (`\subitem`) after `\tabenumitem` (`\item`), you get extra space between two numbers, created by `\tabenumsep` skip. The `\negtabenumsep` command cancels this skip: the version 0.0c included this command inside the `\tabenumitem` definition.

```
\def\tabenumsep{\qquad}
\begin{tabenum}[\bfseries 1)][a)]%
\item
\subitem
$z=\displaystyle\frac xy$;
\nosubitem
$2^x=9;$
\subitem
$3^{2x+3}=4 $.
\subitem
$z=2x^2+4y^2$;\\
\startnumber{4}
\item
\subitem
$u=\sqrt{x^2+y^2+z^2}$;
\subitem
$v=gt+\displaystyle\frac{g}{4}t$,
\subitem
$u=2^{5x-3y+z}$.\\
\startsubnumber{7}\subtabrow
```

[3] If there are not second optional argument, these commands work like `\tabenumitem`/`\item`.

```
\subitem
$w=(v+7)^2+(u-3)^2$;
\subitem
$5^x=\displaystyle\frac{4}{3} ;$
\subitem
$z=(x+1)^2+y^2$;\\
\subtabrow
\subitem
$2+5+8+ \ldots +(3n+2)=155$, $n\in \mathrm{N};$\hidewidth\skipitem
\subitem
$t=5u^2+8v^2$;
\end{tabenum}
```

1) a) $z=\dfrac{x}{y}$; b) $2^x=9$; c) $3^{2x+3}=4$. d) $z=2x^2+4y^2$;

4) a) $u=\sqrt{x^2+y^2+z^2}$; b) $v=gt+\dfrac{g}{4}t$, c) $u=2^{5x-3y+z}$.

g) $w=(v+7)^2+(u-3)^2$; h) $5^x=\dfrac{4}{3}$; i) $z=(x+1)^2+y^2$;

j) $2+5+8+\ldots+(3n+2)=155, n\in\mathrm{N}$; k) $t=5u^2+8v^2$;

There were used two commands `\startnumber` and `\startsubnumber` which set next start numbers for items of each of two levels[4]. The `\startnumber` allows you to divide `tabenum` environment and restart with necessary counter. You may still use the traditional `\setcounter{enum..}{..}` combination, if you know the level of your list and `tabenum`/`subtabenum` environments. For start of the new row from subitem, you need to use 1) the `\skipitem` command to skip column, occupied by the "parent" label (`\tabenumitem`) and 2) the `\negtabenumsep` command to undo column separation. These two commands abbreviated by `\subtabrow` command.

1.5 Placing the QED sign at the end of `tabenum` environment

When the `tabenum` environment is used inside `proof` environment (the `amsthm` package), the better way is to put QED at the end of last `tabenum` line. You may use the `\tabqedhere` command:

Theorem 1. *You may put the QED sign inside the* `tabenum` *environment.*

Proof. Let's put our favorite `tabenum` environment inside the `proof` one, and at the end of it write the `\tabqedhere` (or `\qedhere`) command:

```
\begin{theorem}
 You may put the QED sign inside the \env{tabenum} environment.
\end{theorem}
\begin{proof}
 Let's put...
\begin{tabenum}[\bfseries 1)][a)]%
```

[4]The `\startnumber` command can be used inside any list environment.

```
...
\subitem
$t=5u^2+8v^2$;\qedhere
\end{tabenum}
\end{proof}
```

1) a) $z=\frac{x}{y}$; b) $2^x=9$; c) $3^{2x+3}=4$. d) $z=2x^2+4y^2$;

4) a) $u=\sqrt{x^2+y^2+z^2}$; b) $v=gt+\frac{g}{4}t$, c) $u=2^{5x-3y+z}$.

d) $w=(v+7)^2+(u-3)^2$; e) $5^x=\frac{4}{3}$; f) $z=(x+1)^2+y^2$;

g) $2+5+8+\ldots+(3n+2)=155, n\in\mathrm{N}$; h) $t=5u^2+8v^2$; □

1.6 Restoring of `\item` as command from list environments

`\restorelistitem` For the cases when standard lists appear inside `tablist`, you may restore original `\item` meaning.