

# Learning L<sup>A</sup>T<sub>E</sub>X

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# Chapter 1

## Table environment

### 1.1 title

```
1 \setcounter{MaxMatrixCols}{20}
```

### 1.2 Complex table

Using a combination of `\multirow` and `\multicolumn` commands, We can create complex tables.  
The `\multirow` command require **multirow** package. And the command is defined as follows:

```
1 \multirow{nrows}{width}{content}
```

Note that the **nrows** can be positive or negative, as illustrated in the following example.

### 1.3 Three-line tables

Three-line tables need **booktabs** package its standard format is shown in table 1.2.

The original codes and explanation are:

```
1 \begin{table}[htbp]
2 \caption{caption}\label{labelname(table: tablename)}
3 \vspace{0.5em}\centering
4 \begin{tabular}{cc...c}
5 \toprule[1.5pt]
6 The first cell of header & The second cell of header & ... & The nth cell of ↵
   header \\
7 \midrule[1pt]
8 cell(1,1) & cell(1,2) & ... & cell(1,n)\\
9 cell(2,1) & cell(2,2) & ... & cell(2,n)\\
10 cell(3,1) & cell(3,2) & ... & cell(3,n)\\
11 cell(4,1) & cell(4,2) & ... & cell(4,n)\\
12 .....\\
13 cell(m,1) & cell(m,2) & ... & cell(m,n)\\
14 \bottomrule[1.5pt]
15 \end{tabular}
16 \vspace{\baselineskip}
```

First	Second	
1	123	AB
2		
3		C

Table 1.1: parameters for table

l	left-justified column
c	centered column
r	right-justified column
p{'width'}	paragraph column with text vertically aligned at the top
m{'width'}	paragh column with text vertically aligned in the middle (requires array package)
b{'width'}	paragh column with text vertically aligned at the bottom (requires array package)
	vertical line
	double vertical line

Table 1.2: Three-line table specification

$D(\text{in})$	$P_u(\text{lbs})$	$u_u(\text{in})$	$\beta$	$G_f(\text{psi.in})$
5	269.8	0.000674	1.79	0.04089
10	421.0	0.001035	3.59	0.04089
20	640.2	0.001565	7.18	0.04089
5	269.8	0.000674	1.79	0.04089
10	421.0	0.001035	3.59	0.04089
20	640.2	0.001565	7.18	0.04089
5	269.8	0.000674	1.79	0.04089
10	421.0	0.001035	3.59	0.04089
20	640.2	0.001565	7.18	0.04089
5	269.8	0.000674	1.79	0.04089
10	421.0	0.001035	3.59	0.04089
20	640.2	0.001565	7.18	0.04089

17 `\end{table}`

## 1.4 Long table

When you have a table that spans more than one page, the **longtable** package can help you out. It allows you to specify the column headings such that it prints on each page. Also, you can add a caption on each continued page to indicate that it the table is continued from the previous page. Similarly, you can add a footer to indicate that a table will be continued on the following page. Other than that, the longtable syntax is identical to the regular table environment. The following table spans more than one page:

Table 1.3: Feasible triples for highly variable Grid, MLMMH.

Time (s)	Triple chosen	Other feasible triples
0	(1, 11, 13725)	(1, 12, 10980), (1, 13, 8235), (2, 2, 0), (3, 1, 0)
2745	(1, 12, 10980)	(1, 13, 8235), (2, 2, 0), (2, 3, 0), (3, 1, 0)
5490	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
8235	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
10980	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
13725	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
16470	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
19215	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
21960	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
24705	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
27450	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
30195	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
Continued on next page		

Table 1.3 – continued from previous page

Time (s)	Triple chosen	Other feasible triples
32940	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
35685	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
38430	(1, 13, 10980)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
41175	(1, 12, 13725)	(1, 13, 10980), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
43920	(1, 13, 10980)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
46665	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
49410	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
52155	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
54900	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
57645	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
60390	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
63135	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
65880	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
68625	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
71370	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
74115	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
76860	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
79605	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
82350	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
85095	(1, 12, 13725)	(1, 13, 10980), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
87840	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
90585	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
93330	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
96075	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
98820	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
101565	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
104310	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
107055	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
109800	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
112545	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
115290	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
118035	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
120780	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
123525	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
126270	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
129015	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
131760	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
134505	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
137250	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
139995	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
142740	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
145485	(1, 12, 16470)	(1, 13, 13725), (2, 2, 2745), (2, 3, 0), (3, 1, 0)
148230	(2, 2, 2745)	(2, 3, 0), (3, 1, 0)
150975	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
153720	(1, 12, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
156465	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
159210	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
161955	(1, 13, 16470)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)
164700	(1, 13, 13725)	(2, 2, 2745), (2, 3, 0), (3, 1, 0)

## 1.5 列宽可调表格的绘制方法

论文中能用列宽可调表格的情况共有两种：一种是当插入的表格某一单元格内容过长以至于一行放不下的情况，另一种是当对公式中首次出现的物理量符号进行注释的情况。这两种情况都需要调

用 `tabularx` 宏包。下面将分别对这两种情况下可调表格的绘制方法进行阐述。

## 1.6 表格内某单元格内容过长的情况

首先给出这种情况下的一个例子如表 1.4 所示。绘制这种表格的代码及其说明如下。

Table 1.4: 最小的三个正整数的英文表示法

Value	Name	Alternate names, and names for sets of the given size
1	One	ace, single, singleton, unary, unit, unity
2	Two	binary, brace, couple, couplet, distich, deuce, double, doubleton, duad, duality, duet, duo, dyad, pair, snake eyes, span, twain, twosome, yoke
3	Three	deuce-ace, leash, set, tercet, ternary, ternion, terzetto, threesome, tierce, trey, triad, trine, trinity, trio, triplet, troika, hat-trick

```
\begin{table}[htbp]
\caption{表标题}\label{标签名(通常为 tab:tablename)}
\vspace{0.5em}\wuhao
\begin{tabularx}{\textwidth}{1...X...1}
\toprule[1.5pt]
表头第1个格 & ... & 表头第X个格 & ... & 表头第n个格 & \\
\midrule[1pt]
表中数据(1,1) & ... & 表中数据(1,X) & ... & 表中数据(1,n) & \\
表中数据(2,1) & ... & 表中数据(2,X) & ... & 表中数据(2,n) & \\
..... & & & & & \\
表中数据(m,1) & ... & 表中数据(m,X) & ... & 表中数据(m,n) & \\
\bottomrule[1.5pt]
\end{tabularx}
\vspace{\baselineskip}
\end{table}
```

`tabularx` 环境共有两个必选参数：第1个参数用来确定表格的总宽度，这里取为排版表格能达到的最大宽度||正文宽度`\textwidth`；第2个参数用来确定每列格式，其中标为X的项表示该列的宽度可调，其宽度值由表格总宽度确定。

标为X的列一般选为单元格内容过长而无法置于一行的列，这样使得该列内容能够根据表格总宽度自动分行。若列格式中存在不止一个X项，则这些标为X的列的列宽相同，因此，一般不将内容较短的列设为X。

标为X的列均为左对齐，因此其余列一般选为l（左对齐），这样可使得表格美观，但也可以选为c或r。

## 1.7 对物理量符号进行注释的情况

为使得对公式中物理量符号注释的转行与破折号“——”后第一个字对齐，此处最好采用表格环境。此表格无任何线条，左对齐，且在破折号处对齐，一共有“式中”二字、物理量符号和注释三列，表格的总宽度可选为文本宽度，因此应该采用`tabularx`环境。由`tabularx`环境生成的对公式中物理量符号进行注释的公式如式(1.7.1)所示。

$$\ddot{\rho} - \frac{\mu}{R_t^3} \left( 3\mathbf{R}_t \frac{\mathbf{R}_t \rho}{R_t^2} - \rho \right) = \mathbf{a} \quad (1.7.1)$$

其中生成注释部分的代码及其说明如下。



```
\begin{tabularx}{\textwidth}{@{}l@{\quad}r@{| | |}X@{}}
式中 & symbol-1 & symbol-1的注释内容; \\
& symbol-2 & symbol-2的注释内容; \\
.....: \\
& symbol-m & symbol-m的注释内容。
\end{tabularx}\vspace{\wordsep}
```

---

**tabularx**环境的第1个参数选为正文宽度，第2个参数里面各个符号的意义为：  
 第1个@{}表示在\式中"二字左侧不插入任何文本，\式中"二字能够在正文中左对齐，若无此项，则\式中"二字左侧会留出一定的空白；  
 @{\quad}表示在\式中"和物理量符号间插入一个空铅宽度的空白；  
 @{| | |}实现插入破折号的功能，它由三个1/2的中文破折号构成；  
 第2个@{}表示在注释内容靠近正文右边界的地方能够实现右对齐。

---

由此方法生成的注释内容应紧邻待注释公式并置于其下方，因此不能将代码放入 **table** 浮动环境中。但此方法不能实现自动转页接排，可能会在当前页剩余空间不够时，全部移动到下一页而导致当前页出现很大空白。因此在需要转页处理时，还请您手动将需要转页的代码放入一个新的 **tabularx** 环境中，将原来的一个 **tabularx** 环境拆分为两个 **tabularx** 环境。

若想获得绘制表格的更多信息，参见网络上的 [Tables in L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>: Packages and Methods](#) 文档。

## 1.8 Remove indentations

### 1.8.1 Indentation of whole table

Simply add `\noindent` before `\begin{table}` environment.

### 1.8.2 Indentation within table

Remove the (column separating) space on the left (and possibly on the right) side with a slight modification of the table head. For example:

```
first second
first second
```

```
1 \begin{tabular}{@{} l l @{}}
2 first & second \\
3 first & second \\
4 \end{tabular}
```

## 1.9 Colored table

some	coloured	contents
------	----------	----------

```
1 \begin{tabular}{l|c|r}
2 \hline
3 some & \cellcolor{green}coloured & contents \\
4 \hline
5 \end{tabular}
```



## Chapter 2

# Commands

### 2.1 `\input` vs `\include`

- Use `\include` for large projects like thesis or books to speed up.
- Use `\input` for nested or small project or commands.