

# Creating Tables with LaTeX

Tables are created using the “table” environment given below:

```
\begin{table}[where]
  table
\end{table}
```

In the above syntax, *table* stands for the contents of the ‘tabular’ environment together with a possible `\caption` command. The argument *where* specifies the allowed locations for the table. For example, when `\begin{table}[t]` is typed, it means that the table will appear on the top of the page.

An example of table with four columns is given below. The resulting table is illustrated on page 2 of the sample thesis document as Table 1.1.

```
----- Table example -----
\begin{table}[ht]
\caption{Nonlinear Model Results} % title of Table
\centering % used for centering table
\begin{tabular}{c c c c} % centered columns (4 columns)
\hline\hline %inserts double horizontal lines
Case & Method\#1 & Method\#2 & Method\#3 \\ [0.5ex] % inserts table
%heading
\hline % inserts single horizontal line
1 & 50 & 837 & 970 \\ % inserting body of the table
2 & 47 & 877 & 230 \\
3 & 31 & 25 & 415 \\
4 & 35 & 144 & 2356 \\
5 & 45 & 300 & 556 \\ [1ex] % [1ex] adds vertical space
\hline %inserts single line
\end{tabular}
\label{table:nonlin} % is used to refer this table in the text
\end{table}
----- end of the example -----
```

Table 1.1. Nonlinear Model Results

Case	Method#1	Method#2	Method#3
1	50	837	970
2	47	877	230
3	31	25	415
4	35	144	2356
5	45	300	556

In the above table, **\centering** command is used to center the table. **\begin{tabular}{c c c c}** command creates a table with four columns and ‘c’ is used for centering the column contents. Other column formatting symbols are:

- l** makes the column contents left justified
- r** makes the column contents right justified

The column widths and spacing between the columns are automatically arranged in a table.

To place a double line under the table title, **\hline\hline** command is used. Then, the heading is inserted, i.e., Case & Method\#1 & Method\#2 & Method\#3. ‘&’ symbol separates one column from the following column, and **\** symbol is used to terminate the current row. The [0.5ex] at the end of the headings row is used to add extra vertical spacing between the heading and the first row of the table.

Headings are separated from the body of the table by inserting a single line using **\hline** command. Then, the rows of the table are entered similar to the heading, i.e., 1 & 50 & 837 & 970. At the end of the body of the table, extra vertical space is added using [1ex] command, and a single line is printed using the **\hline** command.

To refer this table in the text, **\label{table:nonlin}** command can be used with a marker of “table:nonlin”. Then, **\ref{table:nonlin}** refers to this table whenever it is needed to print the table number in the text.

If a horizontal line is required in the table, **\cline{n-m}** command is used to draw a horizontal line from the left side of the column n to the right side of the column. A vertical line can be drawn using the **\vline** command. **\vline** draws a vertical line with the height of the row at the location where it appears. Defining columns with | symbol, i.e., **\begin{tabular}{c|c|c|c}**, a vertical line between columns is inserted. However, leaving extra space between rows and columns is preferable instead of drawing lines according to the IIT thesis manual.

## Some Table Examples

**Example-1:** A table with combined columns is given below. `\multicolumn{num}{col}{text}` command is used to combine the following *num* columns into a single column with their total width. The argument *col* contains one of the position symbols, l, r, or c. The argument *text* contains the content of the column. For example, in the example given below, 7 columns are combined into a single column, and the “Sum of Extracted Bits” is centered in the combined column. The output of this table is shown in Table 1.2.

```
----- Example 1 -----
\begin{table}[h]
\caption{Performance Using Hard Decision Detection} %title of the table
\centering % centering table
\begin{tabular}{c rrrrrrr} % creating eight columns
\hline\hline %inserting double-line
Audio Name&\multicolumn{7}{c}{Sum of Extracted Bits} \\ \ [0.5ex]
\hline % inserts single-line
Police & 5 & -1 & 5 & 5 & -7 & -5 & 3 \\ \
Midnight & 7 & -3 & 5 & 3 & -1 & -3 & 5 \\ \
News & 9 & -3 & 7 & 9 & -5 & -1 & 9 \\ \ [1ex] % [1ex] adds vertical space
\hline % inserts single-line
\end{tabular}
\label{tab:hresult}
\end{table}
-----end-----
```

Table 1.2. Performance Using Hard Decision Detection

Audio Name	Sum of Extracted Bits						
Police	5	-1	5	5	-7	-5	3
Midnight	7	-3	5	3	-1	-3	5
News	9	-3	7	9	-5	-1	9

**Example-2:** A table with combined columns and rows is given below. To combine columns `\multicolumn{num}{col}{text}` is used as described in Example 1. To create a combined row `\raisebox{lift}{text}` command is used. This command prints the *text* raised above the current baseline by an amount of *lift*. Thus to create a combined row for the audio name, and audibility columns in the example given below, the first and second column elements of the first row is left empty using ‘& &’. To have single space between the following rows `[-1ex]` command is used, i.e., `& \soft &1 & $-1$ & 1 & 1 & $-1$ & $-1$ & 1 \\ \ [-1ex]`.

Then, in the second row, the audio name, and audibility contents are raised by an amount of 1.5 ex. To have double space between the first and second combined rows of the table [1ex] command is used. The output of this example is shown in Table 1.3.

```

----- Example 2 -----
\begin{table}[h]
\caption{Performance After Post Filtering} % title name of the table
\centering % centering table
\begin{tabular}{1 c c rrrrrr} % creating 10 columns
\hline\hline % inserting double-line
Audio & Audibility & Decision & \multicolumn{7}{c}{Sum of Extracted Bits}
\\ [0.5ex]
\hline % inserts single-line

% Entering 1st row
& & soft & 1 & -1 & 1 & 1 & -1 & -1 & 1 \\[-1ex]
\raisebox{1.5ex}{Police} & \raisebox{1.5ex}{5} & hard
& 2 & -4 & 4 & 4 & -2 & -4 & 4 \\[1ex]

% Entering 2nd row
& & soft & 1 & -1 & 1 & 1 & -1 & -1 & 1 \\[-1ex]
\raisebox{1.5ex}{Beethoven} & \raisebox{1.5ex}{5} & hard
& 8 & -8 & 2 & 8 & -8 & -8 & 6 \\[1ex]

% Entering 3rd row
& & soft & 1 & -1 & 1 & 1 & -1 & -1 & 1 \\[-1ex]
\raisebox{1.5ex}{Metallica} & \raisebox{1.5ex}{5} & hard
& 4 & -8 & 8 & 4 & -8 & -8 & 8 \\[1ex]

% [1ex] adds vertical space
\hline % inserts single-line
\end{tabular}
\label{tab:PPer}
\end{table}
-----end-----

```

Table 1.3. Performance After Post Filtering

Audio	Audibility	Decision	Sum of Extracted Bits						
Police	5	soft	1	-1	1	1	-1	-1	1
		hard	2	-4	4	4	-2	-4	4
Beethoven	5	soft	1	-1	1	1	-1	-1	1
		hard	8	-8	2	8	-8	-8	6
Metallica	5	soft	1	-1	1	1	-1	-1	1
		hard	4	-8	8	4	-8	-8	8

**Example-3:** To create a table in landscape mode, *rotating* package is included with `\usepackage{rotating}` command. Then, the table is produced using `\begin{sidewaystable}`, and `\end{sidewaystable}`. The table given in Table 1.3 can be created in landscape mode as given below, and the screen capture of it is shown in Table 1.4.

```

----- Example 2 -----
\begin{sidewaystable}[h]
\caption{Performance After Post Filtering} % title name of the table
\centering % centering table
\begin{tabular}{1 c c rrrrrr} % creating 10 columns
\hline\hline % inserting double-line
Audio & Audibility & Decision & \multicolumn{7}{c}{Sum of Extracted Bits}
\\ [0.5ex]
\hline % inserts single-line

% Entering 1st row
& &soft & 1 & $-1$ & 1 & 1 & $-1$ & $-1$ & 1 \\[-1ex]
\raisebox{1.5ex}{Police} & \raisebox{1.5ex}{5}&hard
& 2 & $-4$ & 4 & 4 & $-2$ & $-4$ & 4 \\[1ex]

% Entering 2nd row
& &soft & 1 & $-1$ & 1 & 1 & $-1$ & $-1$ & 1 \\[-1ex]
\raisebox{1.5ex}{Beethoven} & \raisebox{1.5ex}{5}&hard
& 8 & $-8$ & 2 & 8 & $-8$ & $-8$ & 6 \\[1ex]

% Entering 3rd row
& &soft & 1 & $-1$ & 1 & 1 & $-1$ & $-1$ & 1 \\[-1ex]
\raisebox{1.5ex}{Metallica} & \raisebox{1.5ex}{5}&hard
& 4 & $-8$ & 8 & 4 & $-8$ & $-8$ & 8 \\[1ex]

% [1ex] adds vertical space
\hline % inserts single-line
\end{tabular}
\label{tab:LPer}
\end{sidewaystable}
-----end-----

```

Table 1.4. Performance After Post Filtering

Audio	Audibility	Decision	Sum of Extracted Bits
Police	5	soft	1 -1 1 1 -1 1
		hard	2 -4 4 4 -2 -4 4
Beethoven	5	soft	1 -1 1 1 -1 1
		hard	8 -8 2 8 -8 8 6
Metallica	5	soft	1 -1 1 1 -1 1
		hard	4 -8 8 4 -8 -8 8