

Introduction to \LaTeX

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- Tables
- Figures
- Beamer Template
- Useful Tips

Tables

How to make table?

```
1 \begin{table}[ht]
2   \centering
3   \begin{tabular}{ccc}           % alignment(c: center, l: left, r: right)
4     \hline                     % horizontal line
5     Var1 & Var2 & Var3 \\       % table elements(variable name + value)
6     \hline
7     1 & 2 & 3 \\
8     4 & 5 & 6 \\
9     7 & 8 & 9 \\
10    \hline
11    \end{tabular}
12    \caption{Table example}      % caption
13  \end{table}
```

Listing 1: Table example code

How to make table?

Var1	Var2	Var3
1	2	3
4	5	6
7	8	9

Table 1: Table example

Multiple columns and rows

▷ Multiple rows

```
1 \usepackage{multirow}
2
3 \begin{table}[ht]
4   \centering
5   \begin{tabular}{ccc}
6     \hline
7     Var1 & Var2 & Var3 \\
8     \hline
9     \multirow{2}{2}{4em}{multi row} & 3 & \\
10    & 5 & 6 \\
11    7 & 8 & 9 \\
12    \hline
13  \end{tabular}
14 \end{table}
```

▷ Multiple columns

```
1 \begin{table}[ht]
2   \centering
3   \begin{tabular}{ccc}
4     \hline
5     Var1 & Var2 & Var3 \\
6     \hline
7     1 & 2 & 3 \\
8     4 & 5 & 6 \\
9     7 & 8 & 9 \\
10    \hline
11  \end{tabular}
12 \end{table}
```

Multiple columns and rows

▷ Multiple rows

Var1	Var2	Var3
multi row	2	3
	5	6
7	8	9

▷ Multiple columns

Var1	Var2	Var3
1	multi col	
4	5	6
7	8	9

- GUI 형태로 값을 입력하는 방식
- 입력된 테이블을 $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ 코드로 변환해줌
- Table Generator

Tables Generator

The screenshot shows the LaTeX Tables Generator web application. At the top, there's a navigation bar with tabs for LaTeX Tables (selected), HTML Tables, Text Tables, Markdown Tables, and MediaWiki Tables. Below this is the title "LaTeX Tables Generator" and a Facebook link. A menu bar includes File, Edit, Table, Column, Row, Cell, and Help. A toolbar contains icons for table structure and styling, along with a "Default table style" dropdown. The main area displays a table with 3 columns (A, B, C) and 5 rows. The first row contains "Var1", "Var2", and "Var3". The second row contains "1", "2", and "3". The third row contains "4", "5", and "6". The fourth row contains "7", "8", and "9". The fifth row contains "4", "7", and "9". Below the table is a "Generate" button. To the right of the table is a "Show an example table" link. Below the table, there's a "Result" section with a "Copy to clipboard" button. The result shows the LaTeX code for the table:

```
1 \begin{table}[]
2 \begin{tabular}{lll}
3 Var1 & Var2 & Var3 \\
4 1 & 2 & 3 \\
5 4 & 5 & 6 \\
6 7 & 8 & 9 \\
7 \end{tabular}
8 \end{table}
```

 Below the code, there are checkboxes for "Escape special TeX symbols (% , & _ # \$)", "Compress whitespace", and "Smart output formatting". There is also an "Extra options..." dropdown.

Tables Generator

LaTeX Tables HTML Tables Text Tables Markdown Tables MediaWiki Tables

LaTeX Tables Generator

File Edit Table Column Row Cell Help Show an example table

Generate

Result (click "Generate" to refresh) Copy to clipboard

```
1 \begin{table}[]
2 \begin{tabular}{lll}
3 Var1 & Var2 & Var3 \\
4 1 & 2 & 3 \\
5 4 & 5 & 6 \\
6 7 & 8 & 9 \\
7 \end{tabular}
8 \end{table}
```

☒ Escape special TeX symbols (% , & _ # \$)
☐ Compress whitespace ☐ Smart output formatting
Extra options...

Figure 1: Example table using Table Generator

- R의 dataframe or matrix type을 L^AT_EX 코드로 변환시켜주는 package
- "xtable(df)" 형식으로 사용
- L^AT_EX 코드가 반환

```
> head(iris)
  Sepal.Length Sepal.width Petal.Length Petal.width Species
1         5.1         3.5         1.4         0.2   setosa
2         4.9         3.0         1.4         0.2   setosa
3         4.7         3.2         1.3         0.2   setosa
4         4.6         3.1         1.5         0.2   setosa
5         5.0         3.6         1.4         0.2   setosa
6         5.4         3.9         1.7         0.4   setosa
```

Figure 2: The sample dataframe object

```
> library(xtable)
> xtable( head(iris) )
% latex table generated in R 3.6.1 by xtable 1.8-4 package
% Fri Jan 31 18:20:12 2020
\begin{table}[ht]
\centering
\begin{tabular}{rrrrr}
\hline
& Sepal.Length & Sepal.width & Petal.Length & Petal.width & Species \\
\hline
1 & 5.10 & 3.50 & 1.40 & 0.20 & setosa \\
2 & 4.90 & 3.00 & 1.40 & 0.20 & setosa \\
3 & 4.70 & 3.20 & 1.30 & 0.20 & setosa \\
4 & 4.60 & 3.10 & 1.50 & 0.20 & setosa \\
5 & 5.00 & 3.60 & 1.40 & 0.20 & setosa \\
6 & 5.40 & 3.90 & 1.70 & 0.40 & setosa \\
\hline
\end{tabular}
\end{table}
```

Figure 3: Output of xtable function

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.10	3.50	1.40	0.20	setosa
2	4.90	3.00	1.40	0.20	setosa
3	4.70	3.20	1.30	0.20	setosa
4	4.60	3.10	1.50	0.20	setosa
5	5.00	3.60	1.40	0.20	setosa
6	5.40	3.90	1.70	0.40	setosa

Table 2: The table using output of xtable function

Figures

How to input figures?

```
1 \begin{figure}[h] % t: top, b: bottom, h: here
2   \begin{center}
3     \includegraphics[width=0.7\linewidth]{img/figure.png}
4   \end{center}
5   \caption{Figure example} % caption
6   \label{fig:long}
7   \label{fig:onecol}
8 \end{figure}
```

Listing 2: Figure example code

How to input figures?

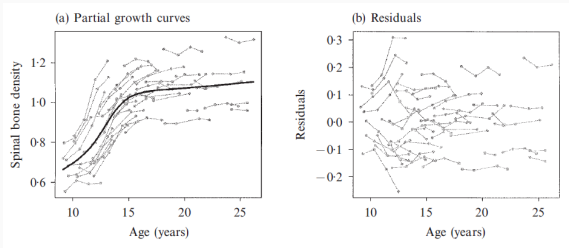


Figure 4: Figure example

Beamer Template

What is Beamer?

- 발표자료 형태의 L^AT_EX 문서
- 각 슬라이드에 내용을 넣는 방식으로 구성됨
- theme, color에 따라 다양한 양식 존재
- Beamer theme matrix

What is Beamer?

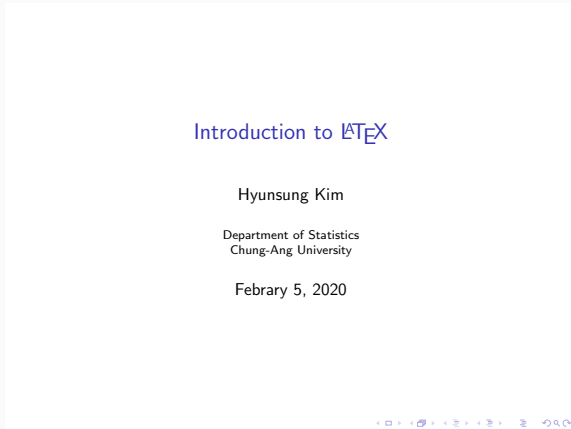


Figure 5: Beamer example

What is Beamer?

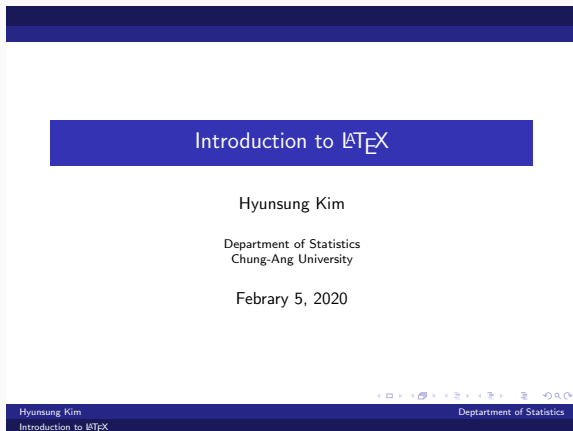


Figure 6: Berlin theme

What is Beamer?

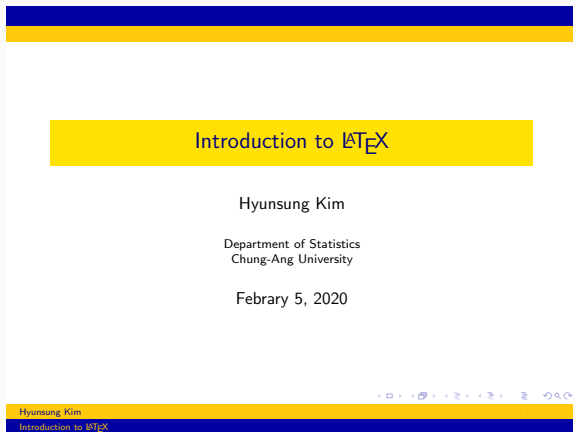


Figure 7: Berlin theme + wolverine colortheme

Example Code - Title

```
1 \documentclass{beamer}      % document type
2
3 \usetheme{Berlin}          % theme
4 \usecolortheme{wolverine}   % color theme
5
6 \title{Introduction to \LaTeX}
7 \date[Short Occasion]{February 5, 2020}
8 \author{Hyunsung Kim}
9 \institute[Department of Statistics]
10 {Department of Statistics\\ Chung-Ang University}
11 \subject{Introduction to \LaTeX}
12
13 % create slides here
14 \begin{document}
15
16   % main title
17   \begin{frame}
18     \titlepage
19   \end{frame}
20
21 \end{document}
```

Listing 3: Title code

Example Code - Slides

```
1 \begin{document}
2
3 \section{Section 1}
4
5 \subsection{Subsection 1}
6
7 % slide 1
8 \begin{frame}{Frame 1}
9 \begin{itemize}
10 \item {
11     item 1
12 }
13 \item {
14     item 2
15 }
16 \end{itemize}
17 \end{frame}
18
19 \end{document}
```

Listing 4: Slides code

Frame 1

- item 1
- item 2

1

Figure 8: Slides example

Useful Tips

- 수식 작성시 반복해서 사용하게 되는 코드가 생김(bold체 등)
- L^AT_EX 파일 상단에 축약해놓은 명령어를 지정해 놓고 사용하면 매우 편리!

Difference of codes

$$\mathbf{B}_i \mathbf{\Theta} \mathbf{D} \mathbf{\Theta}^T \mathbf{B}_i^T$$

▷ Original code

```
1  $$
2  \mathbf{B}_i \ \boldsymbol{\Theta} \ \mathbf{D} \ \boldsymbol{\Theta}^T \ \mathbf{B}_i^T
3  $$
```

▷ User defined code

```
1  $$
2  \bB_i \bTheta \bD \bTheta^T \bB^T_i
3  $$
```

User defined command

▷ 다음과 같이 정의하여 사용하면 됨

```
1 \def \bY { \mathbf{Y} }
2 \def \bB { \mathbf{B} }
3 \def \bI { \mathbf{I} }
4 \def \bD { \mathbf{D} }
5 \def \bbeta { \boldsymbol{\beta} }
6 \def \btheta { \boldsymbol{\theta} }
7 \def \bTheta { \boldsymbol{\Theta} }
8 \def \balpha { \boldsymbol{\alpha} }
```

- 코드를 같이 제출하는 과제가 있는 강의를 들을 때 유용 (통계계산론, 데이터마이닝 등)
- 단순 코드 복붙보다 깔끔하게 정리 가능
- 코드를 L^AT_EX 파일에 직접 넣지 않고 코드 파일을 첨부하여 사용 가능
- Reference

- L^AT_EX 파일 compile시, pdf 뿐만 아니라 다른 파일들이 같이 생김
- 임시 파일들이 따로 폴더에 들어가도록 설정할 수 있음
- TeXstudio + Miktex 기준의 설정 방법
- PdfLaTeX의 명령어를 다음과 같이 수정하여 설정 가능
`pdflatex.exe -synctex=0 -interaction=nonstopmode
--aux-directory=build %.tex`

How to config Build directory?

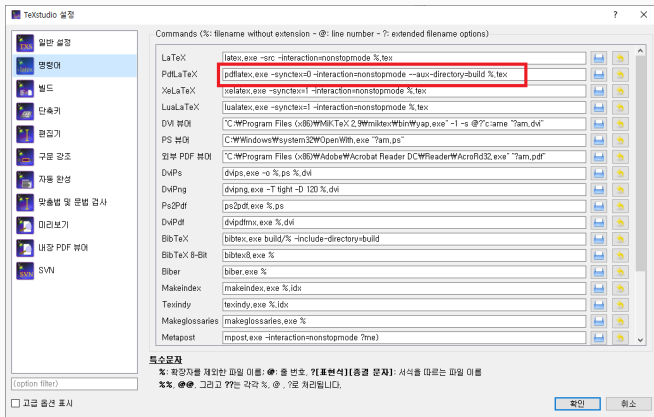


Figure 9: Settings in textstudio

Before configuration

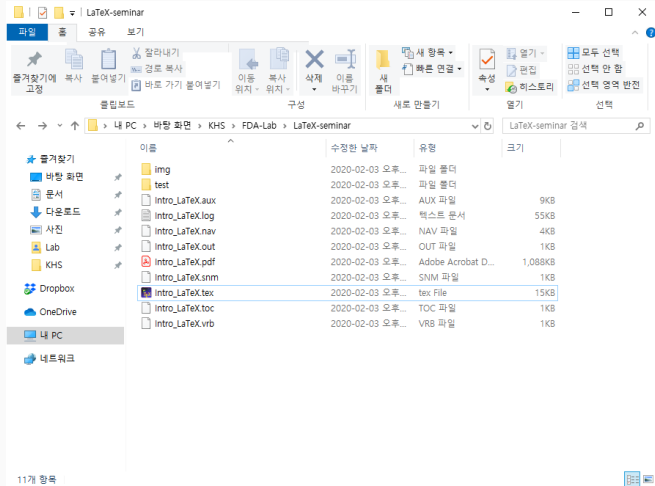


Figure 10: Before configuration

After configuration

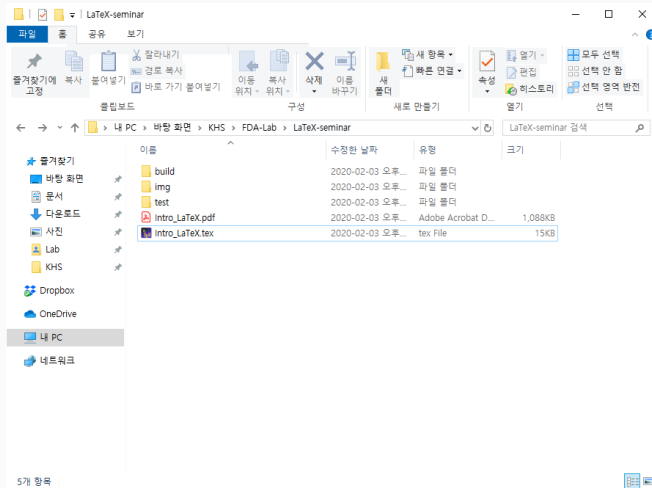


Figure 11: After configuration

- Rmarkdown으로 L^AT_EX 문서 작성 가능
(단, L^AT_EX 설치되어 있는 경우만 가능)
- Markdown 문법 + L^AT_EX 혼용 가능
- Reference

감사합니다!