Introduction to LaTeX

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Outline

1 Useful methods
- `xtable` package
- User defined command
- Code block

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xtable package

- R의 dataframe or matrix 형태를 LaTeX 코드로 변환시켜주는 package
- print되는 output을 그대로 복사해서 사용하면 됨

xtable package

```
> 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: The sample dataframe object

xtable package

```
> 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}{rrrrrl}
  \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: Output of `xtable` function

xtable package

	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: The table using output of `xtable` function

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User defined command

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

Before using user defined command

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

```
% Don't use user defined command
$$ \mathbf{B}_i \boldsymbol{\Theta} \mathbf{D} \
  boldsymbol{\Theta}^T \mathbf{B}^T_i $$
```

User defined command

```
\def \bY { \mathbf{Y} }
\def \bB { \mathbf{B} }
\def \bI { \mathbf{I} }
\def \bD { \mathbf{D} }
\def \bbeta { \boldsymbol{\beta} }
\def \btheta { \boldsymbol{\theta} }
\def \bTheta { \boldsymbol{\Theta} }
\def \balpha { \boldsymbol{\alpha} }
```

After using user defined command

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

```
% Use user defined command
$$ \bB_i \bTheta \bD \bTheta^T \bB^T_i $$
```

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Code block

- 간혹 과제 제출할 때, 코드를 같이 제출하게 되는 강의를 들을 때 유용(통계계산론, 데이터마이닝 등등)
- 단순히 코드 복사해서 붙여넣는 것보다는 나름 깔끔하게 정리 가능
- 설명은 링크로 대체 ⇒
  `https://www.overleaf.com/learn/latex/Code_listing`

Cross-covariance and cross-correlation functions

Cantour plots of correlation functions

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4          4.6         3.1          1.5         0.2  setosa
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```
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  5 & 5.00 & 3.60 & 1.40 & 0.20 & setosa \\
  6 & 5.40 & 3.90 & 1.70 & 0.40 & setosa \\
   \hline
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```

Reference


J.O. Ramsay, B.W. Silverman.
Functional Data Analysis 2nd edition.
Springer, 2005.