hmwu-LaTeX-Example.tex

```latex
 1 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 2 % Header                                            %
 3 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 4 \documentclass[11pt]{article}
 5 \usepackage{epsfig, color}
 6 \usepackage[svgnames]{xcolor}
 7 \usepackage{moreverb} % source code listing
 8 \usepackage{listings} % R source code
 9 \usepackage{fancybox}
10 \usepackage{hyperref} % links
11
12 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
13 % 中文設定                                          %
14 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
15 \usepackage{xltxtra, fontspec, xunicode} % 設定字體
16 \usepackage[slantfont, boldfont]{xeCJK} % 允许斜体和粗体 %讓中英文字體分開設置
17 \setCJKmainfont{微軟正黑體} % 可以改用「標楷體」、「細明體」
18 \XeTeXlinebreaklocale "zh" % 中文才能自動換行
19 \XeTeXlinebreakskip = 0pt plus 1pt % 中文才能自動換行
20
21 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
22 % R程式碼列印設定                                   %
23 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
24 \lstset{language=R,
25   basicstyle=\ttfamily,
26   stringstyle=\color{red},
27   otherkeywords={0, 1, 2, 3, 4, 5, 6, 7, 8, 9},
28   morekeywords={TRUE, FALSE},
29   keywordstyle=\color{blue},
30   commentstyle=\tt\color{DarkGreen}
31 }
32
33 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
34 % Page Format                                       %
35 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
36 \setlength{\textheight}{23cm}
37 \setlength{\textwidth}{16cm}
38 \setlength{\topmargin}{-1in}
39 \setlength{\oddsidemargin}{0in}
40 \setlength{\evensidemargin}{0in}
41
42 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
43 % renewcommand                                      %
44 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
45 \newcommand{\mt}{\multicolumn}
46 \newcommand{\blue}[1]{\textcolor{blue}{#1}}
47 \renewcommand{\contentsname}{目錄} % Contents
48 \renewcommand{\figurename}{圖} % Figure
49 \renewcommand{\tablename}{表} % Table
50 \renewcommand{\refname}{參考文獻} % References
51 \renewcommand{\listfigurename}{圖目錄} % List of Figures
52 \renewcommand{\listtablename}{表目錄} % List of Tables
```

```
53 \renewcommand{\baselinestretch}{1.2}
54
55 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
56 % Title                                         %
57 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
58 \begin{document}
59
60 \title{\LaTeX \ 教學範例文件}
61 \author{吳漢銘\footnote{E-mail: {\it hmwu@gm.ntpu.edu.tw}} \\
62      {\it 國立臺北大學統計學系}}
63 \date{\today}
64 \maketitle
65
66 \tableofcontents
67 \listoffigures
68 \listoftables
69 \clearpage
70
71 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
72 % Section: Introduction                           %
73 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
74 \section{簡介}\label{set:intro}
75 Hello {\Large everyone}! This {\bf is} a
76 \LaTeX\footnote{\url{https://www.latex-project.org}} \
   \textcolor{red}{example}
77 {\tt document}. 這是一份 \LaTeX {\bf 教學文件}，希望大家學習愉快。
78
79 \begin{itemize}
80 \item 要找一本好的工具書來參考，例如Shultis (1994) \cite{Shultis94}。
81 \item 安裝軟體為 MikteX (\url{https://miktex.org}) 和 TeXStudio
82 (\url{http://www.texstudio.org})。
83 \item 文件副檔名為{\tt .tex}。有分中文文件及英文文件。
84 \item 開啟範例檔案測試: {\tt C:\textbackslash Program Files
85 (x86)\textbackslash TeXstudio\textbackslash templates\textbackslash
86 template\_Article.tex}。 Build \& View (F5)。
87 \item 編譯過程: PDFLaTeX(英文文件)，XeLaTeX(中英文文件)。
88 \item 編譯及預覽(英文): Tools $\Rightarrow$ Build \& View。或
89 Tools $\Rightarrow$ Commands $\Rightarrow$ PDFLaTeX。
90 \item 編譯及預覽(中英文)(F6): Tools $\Rightarrow$ Commands $\Rightarrow$
   XeLaTeX。
91 \item 使用\verb|\label{maker}|和\verb|\ref{maker}|。 例如第\ref{set:math}節
   中的
92 式子(\ref{def:derivative})是微分的定義。圖\ref{fig:iris}是一個散佈圖, 它在第
93 \pageref{fig:iris}頁。(要編譯兩次以上，才可更新目錄或編號)。
94 \item 自行google這些巨集套件的用法: {\tt moreverb}、{\tt listings}、{\tt
95 fancybox}、{\tt hyperref}。
96 \item \% 是註解符號。用\verb|\iffalse ... \fi|註解一個段落。文字a、數式$a$、
   程式碼{\tt
97 a}。
98 \item 線上\LaTeX:
99   \begin{itemize}
100  \item
   \blue{\url{https://www.tutorialspoint.com/online\_latex\_editor.php}}
```

```
101    \item \blue{\url{https://www.overleaf.com}}
102    \item \blue{\url{https://www.latex4technics.com}}
103    \end{itemize}
104 \item 符號表
105    \begin{itemize}
106      \item 選按
    \href{http://tug.ctan.org/info/symbols/comprehensive/symbols-a4.pdf}
107              {「The Comprehensive LaTeX Symbol List」}即可連結。
108      \item \blue{https://oeis.org/wiki/List\_of\_LaTeX\_mathematical\_symbols}
109    \end{itemize}
110 \end{itemize}
111
112 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
113 % Section: Equations                               %
114 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
115 \section{數學式}\label{set:math}
116
117 \subsection{文中數式 {\tt \$ ... \$}}
118 \begin{enumerate}
119 \item 大家最熟悉的ㄟK死霸: $\bar{X}=\sum_{i=1}^n x_i/n$。
120      (\verb|$\bar{x}=\sum_{i=1}^n x_i/n$|)。
121 \item 要計算$\int_0^{\pi/2} \sin^2 x\ dx$很簡單。
122      (\verb|$\int_0^{\pi/2} \sin^2 x\ dx$|)
123 \end{enumerate}
124
125
126 \subsection{單獨數式 {\tt \textbackslash[ ... \textbackslash]}}
127 \begin{enumerate}
128 \item \verb|\[ ... \]|， 單一數式無標號。號稱最美的數學公式: \\
129      (\verb|\[ e^{i\pi} + 1 = 0. \qquad (\mbox{歐拉恆等式})\]|)
130      \[ e^{i\pi} + 1 = 0. \qquad (\mbox{歐拉恆等式})\]
131 \item \verb|\begin{equation} ... \end{equation}|， 單一數式有標號。\\
132      The derivative of a function $f$ at a point $x_0$, denoted $f'(x_0)$,
    is
133      \begin{equation}
134      f'(x_0) = \lim_{h \rightarrow 0} \frac{f(x_0+h)-f(x_0)}{h}
135      \label{def:derivative}
136      \end{equation}
137      provides this limit exists.
138 \item \verb|\begin{eqnarray} ... & ... & ... \end{eqnarray}|，多數式有標號。
    \\
139      \begin{eqnarray}
140      \lim_{x\rightarrow \infty} \left( 5 + \frac{1}{x} \right)
141      &=& \lim_{x\rightarrow \infty} 5 +
142         \lim_{x\rightarrow \infty} \frac{1}{x}\\
143      &=& 5 + 0 \\
144      &=& 5       \label{ex:answer}
145      \end{eqnarray}
146 \end{enumerate}
147
148
149 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
150 % Section: Figure                                  %
```

```
151 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
152 \section{圖形}\label{set:figure}
153 記得圖檔和tex檔要放在同一目錄,
154 可直接利用\verb|\includegraphic|引入圖形。圖形分兩種格式類型:
155 壓縮格式圖形(例如: JPEG/PNG檔,如以下)和向量圖形(例如: EPS/PDF檔,如圖
    \ref{fig:iris})。
156 \begin{center}
157   \includegraphics[scale=0.3]{R_logo.svg.png}
158   \includegraphics[scale=0.6]{RStudio.jpg}
159 \end{center}
160
161 % 全文照印環境
162 \begin{verbatim}
163 \begin{center}
164   \includegraphics[scale=0.3]{R_logo.svg.png}
165   \includegraphics[scale=0.6]{RStudio.jpg}
166 \end{center}
167 \end{verbatim}
168
169
170 \begin{figure}[htbp]
171 \centering
172 \includegraphics[scale=0.6]{iris.pdf}
173 \caption{圖形置於figure環境中,自動編號。}\label{fig:iris}
174 \end{figure}
175
176
177 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
178 % Section: Table                                      %
179 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
180 \section{表格}\label{set:table}
181 這裡很多範例可以參考: \url{https://en.wikibooks.org/wiki/LaTeX/Tables}
182
183 \subsection*{\underline{簡單表格}}
184
185 以\verb|\begin{tabular} ... \end{tabular}| 製作表格,可用
186 \verb|\begin{center} ... \end{center}| 置中。\\
187
188 \begin{minipage}[c]{0.5\linewidth}
189 \begin{tabular}{l|c|r}  \hline
190   Software  & Price & Good \\ \hline
191   MikTeX    & 56    & Yes \\
192   TeXstudio & 8     & Yes \\ \hline
193 \end{tabular}
194 \end{minipage}
195 \begin{minipage}[c]{0.5\linewidth}
196 \begin{verbatim}
197 \begin{tabular}{l|c|r}  \hline
198   Software  & Price & Good \\ \hline
199   MikTeX    & 56    & Yes \\
200   TeXstudio & 8     & Yes \\ \hline
201 \end{tabular}
202 \end{verbatim}
```

```
203 \end{minipage}
204
205 \subsection*{\underline{置於{\tt table}環境裡的表格}}
206
207 \verb|\begin{table}\begin{tabular} ... \end{tabular} \end{table}|
208
209 \begin{table}[htb]
210 \caption{Characteristics of the datasets. All datasets contain no
211 missing observations.} \label{data} \centerline{}
212 \begin{center}
213 \begin{tabular}{|cc|rrrrr|} \hline
214     &      & \mt{5}{c|}{Number of attributes}  \\ \cline{3-7}
215 Data& No. of & Score &\mt{3}{c}{Categorical }& Total\\ \cline{4-6}
216 Set & Cases&      & A & B & C    & \\ \hline
217 {\tt bcw} & 683  & 9 & $\times$     & $\vee$  & $\pm$   & 9    \\
218 {\tt cmc} & 1473 & 2 & 3 & \"{o}    & 4  & 9   \\
219 {\tt wav} & 600  & 21& $\clubsuit$  & $\alpha$ & $\beta$  & 21 \\
    \hline
220 \end{tabular}
221 \end{center}
222 \end{table}
223
224
225 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
226 % Section: Reference                                 %
227 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
228 \addcontentsline{toc}{section}{參考文獻}
229 \begin{thebibliography}{99}
230 \bibitem{Shultis94}
231 Shultis, J. K., 1994, \LaTeX Notes: Practical Tips for Preparing
232 Technical Documents, Englewood Cliffs, N.J. : PTR Prentice Hall.
233 \bibitem{Goossens94}
234 Goossens, M., Mittelbach, F., and Samarin, A., 1994, The \LaTeX \
235 Companion, Reading, Mass.: Addison.
236 \end{thebibliography}
237
238
239
240 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
241 % Appendix                                           %
242 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
243 \addcontentsline{toc}{section}{附錄}
244 \appendix
245 \section{程式碼 (一般/加框)}
246 程式碼不可用細明體，不可用Time New Roman字體。\\
247
248 \begin{Sbox}
249 \begin{minipage}{12cm}
250 \begin{verbatim}
251 rmvn.svd <- function(n, mu, Sigma){
252     d <- length(mu)
253     S <- svd(Sigma)
254     R <- S$u %*% diag(sqrt(S$d)) %*% t(S$v) #sqrt Sigma
```

```
255      Z <- matrix(rnorm(n*d), nrow=n, ncol=d)
256      X <- Z %*% R + matrix(mu, n, d, byrow=TRUE)
257      X
258 }
259 \end{verbatim}
260 \end{minipage}
261 \end{Sbox}
262 \fbox{\TheSbox}
263
264
265 \section{程式碼（編行號）}
266 \begin{listing}[1]{1}
267 x <- loc.mix(1000, 0.5, rep(0, 4), 2:5, Sigma=diag(4))
268 r <- range(x)*1.2
269 par(mfrow=c(2, 2))
270 for(i in 1:4){
271      hist(x[,i], xlim=r, ylim=c(0, 0.3), freq=FALSE, main="")
272 }
273 \end{listing}
274
275
276 \section{程式碼（語法突顯）}
277 \begin{lstlisting}
278 > dice <- sample(1:6, 10, replace=TRUE) # 丟一骰子10次
279 > dice
280  [1] 4 3 1 2 6 6 3 5 4 3
281 > mean(dice) # average
282 [1] 3.7
283 \end{lstlisting}
284 註: 你也可以直接匯入一個{\sf R}程式碼檔:
285 \verb|\lstinputlisting[language=R]{myRcode.R}|。
286
287
288 \end{document} %文件結束
289
290 document 後面的文字就不會編譯了。
291
292
```