

# HEC MONTRÉAL

Writing with  
`\title{LATEX}`

Advanced Notions

BENOIT HAMEL



Benoit Hamel  
Library technician, technical support  
HEC Montréal Library

# Writing with `\title{LATEX}`

Part Two : Advanced Notions  
HEC Montréal Edition, revised and extended (english version)

© 2016 Vincent Goulet for the [original version](#). A list of sources that have been used for elaborating this training session can be found at the end of this document.

© This work is provided under the [Creative Commons Attribution-ShareAlike 4.0 International \(CC BY-SA 4.0\)](#) license. According to the license, you are free to :

- share – copy and redistribute the material in any medium or format ;
- adapt – remix, transform, and build upon the material for any purpose, even commercially.

Under the following terms :

- Attribution – You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
- ShareAlike – If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.
- No additional restrictions – You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.

# Training Session Summary

## Floats

Tables

Figures

## Maths

Math Modes

Symbols

## Bibliographies and citations

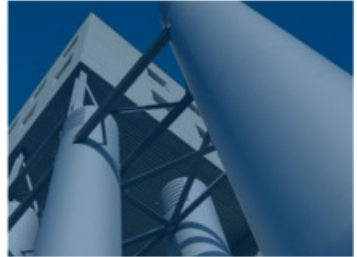
Types of bibliographies

Creating a Bibliography

Citations

## Bibliography

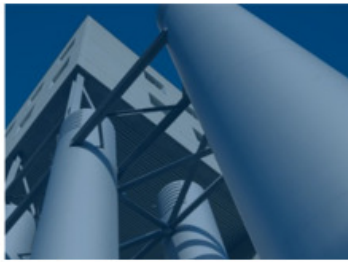
# Floats



# Floats

It was already said that the strength of  $\text{T}_{\text{E}}\text{X}$  and  $\text{\LaTeX}$  is typography and that it was better to let the systems do their work automatically.

Tables and figures (images and graphics) are an excellent example of the systems' power.



◀ ◻ ▶ ◀ ◻ ▶ ◀ ≡ ▶ ◀ ≡ ▶ ≡ ↺ 🔍 ↻

BENOIT HAMEL

# Tables

## Introduction

- Building tables in  $\text{\LaTeX}$  can be tricky.
- There isn't one, nor two, but many ways to build tables.
- $\text{\LaTeX}$  provides two environments : `tabular` and `tabular*`.

```
\begin{tabular}{columns}  
  cell1 & cell2 & cell3 \\  
  cell4 & cell5 & cell6 \\  
  cell7 & cell8 & cell9  
\end{tabular}
```

```
\begin{tabular*}{width}{columns}  
  cell1 & cell2 & cell3 \\  
  cell4 & cell5 & cell6 \\  
  cell7 & cell8 & cell9  
\end{tabular*}
```

- We will also take a look at a third environment, `tabularx`, provided by its eponymic package.
- `tabularx`'s syntax is the same as `tabular`'s.



# Tables

## Building

Let's take a look at the last frame's tables :

```
\begin{tabular}{columns}  
  cell1 & cell2 & cell3 \\  
  cell4 & cell5 & cell6 \\  
  cell7 & cell8 & cell9  
\end{tabular}
```

```
\begin{tabular*}{width}{columns}  
  cell1 & cell2 & cell3 \\  
  cell4 & cell5 & cell6 \\  
  cell7 & cell8 & cell9  
\end{tabular*}
```

# Tables

## Building

Let's take a look at the last frame's tables :

```
\begin{tabular}{columns}  
  cell1 & cell2 & cell3 \\  
  cell4 & cell5 & cell6 \\  
  cell7 & cell8 & cell9  
\end{tabular}
```

```
\begin{tabular*}{width}{columns}  
  cell1 & cell2 & cell3 \\  
  cell4 & cell5 & cell6 \\  
  cell7 & cell8 & cell9  
\end{tabular*}
```

- We define the **number of cells** and their **horizontal alignment** in the `columns` argument.
  - Possible options are `l` (*left*), `c` (*center*), and `r` (*right*).
  - We define a fixed-width column with `p{width}`.
  - `tabularx` also takes the `X` option, which adjusts cell width according to the table width.
  - The `|` symbol is used to insert a vertical line between cells.

# Tables

## Building

Let's take a look at the last frame's tables :

```
\begin{tabular}{columns}  
  cell1 & cell2 & cell3 \\  
  cell4 & cell5 & cell6 \\  
  cell7 & cell8 & cell9  
\end{tabular}
```

```
\begin{tabular*}{width}{columns}  
  cell1 & cell2 & cell3 \\  
  cell4 & cell5 & cell6 \\  
  cell7 & cell8 & cell9  
\end{tabular*}
```

- A table's **width** depends of the environment :
  - `tabular` : table width = content width ;
  - `tabular*` and `tabularx` : width determined by the `width` argument.

# Tables

## Building

Let's take a look at the last frame's tables :

```
\begin{tabular}{columns}  
  cell1 & cell2 & cell3 \\  
  cell4 & cell5 & cell6 \\  
  cell7 & cell8 & cell9  
\end{tabular}
```

```
\begin{tabular*}{width}{columns}  
  cell1 & cell2 & cell3 \\  
  cell4 & cell5 & cell6 \\  
  cell7 & cell8 & cell9  
\end{tabular*}
```

- Cells from a specific **row** are separated by the & symbol.
- A row ends with `\\`, **except for the last row**.
- A horizontal line can be inserted between rows with `\hline` .
- The `\multicolumn{cols}{pos}{text}` command is used to merge cells in a row.
  - `cols` : a cell's column span;
  - `pos` : horizontal alignment (l,c,r);
  - `text` : cell content.

# Tables

## Example

```
\begin{tabularx}{\textwidth}{X|rrr|r|rrr}  
  \textbf{Teams}      & \multicolumn{7}{c}{\textbf{Statistics}} \\ \hline \hline  
  NFC North      & W & L & T & PCT   & PF & PA & Net Pts \\ \hline  
  Minnesota Vikings & 13 & 3 & 0 & .813  & 382 & 252 & 130 \\ \hline  
  Detroit Lions    & 9  & 7 & 0 & .563  & 410 & 376 & 34 \\ \hline  
  Green Bay Packers & 7  & 9 & 0 & .438  & 320 & 384 & -64 \\ \hline  
  Chicago Bears    & 5  & 11 & 0 & .313  & 264 & 320 & -56 \\ \hline  
\end{tabularx}
```

Teams	Statistics						
NFC North	W	L	T	PCT	PF	PA	Net Pts
Minnesota Vikings	13	3	0	.813	382	252	130
Detroit Lions	9	7	0	.563	410	376	34
Green Bay Packers	7	9	0	.438	320	384	-64
Chicago Bears	5	11	0	.313	264	320	-56

# Floating tables

- The `tabular`, `tabular*` and `tabularx` insert tables in a document where they have been written in the text.
- $\text{\LaTeX}$  can determine the best place to insert tables with the `table` environment.

```
\begin{table}[location]  
  \begin{tabularx}{\textwidth}{lccc}  
    ...  
  \end{tabularx}  
  \caption{text}  
\end{table}
```

# Floating tables

- The `tabular`, `tabular*` and `tabularx` insert tables in a document where they have been written in the text.
- $\text{\LaTeX}$  can determine the best place to insert tables with the `table` environment.

```
\begin{table}[location]  
  \begin{tabularx}{\textwidth}{lccc}  
    ...  
  \end{tabularx}  
  \caption{text}  
\end{table}
```

- The optional `location` argument takes one or more of the following options :
  - t** Table inserted on *top* of the page
  - b** Table inserted at the *bottom* of the page
  - p** Table inserted in a reserved *page*
  - h** Table inserted *here*, meaning it's inserted where it was written in the text
- Use `\caption` to insert a caption below of above a table.
- `\listoftables` generates a list of all the table environments inserted in the text.

# Floating tables

```
\begin{table}  
  \begin{tabularx}{\textwidth}{X|rrr|r|rrr}  
    Teams      & W & L & T & PCT   & PF   & PA   & Net Pts \\ \hline  
    Minnesota Vikings & 13 & 3 & 0 & .813  & 382  & 252  & 130 \\ \hline  
    Detroit Lions    & 9  & 7 & 0 & .563  & 410  & 376  & 34  \\ \hline  
    Green Bay Packers & 7  & 9 & 0 & .438  & 320  & 384  & -64 \\ \hline  
    Chicago Bears    & 5  & 11 & 0 & .313  & 264  & 320  & -56 \\ \hline  
  \end{tabularx}  
  \caption{The NFL NFC North 2017 Season Statistics}  
\end{table}
```

Teams	W	L	T	PCT	PF	PA	Net Pts
Minnesota Vikings	13	3	0	.813	382	252	130
Detroit Lions	9	7	0	.563	410	376	34
Green Bay Packers	7	9	0	.438	320	384	-64
Chicago Bears	5	11	0	.313	264	320	-56

**Tableau** – The NFL NFC North 2017 Season Statistics





## Figures

# Inserting images

- To insert images in a  $\text{\LaTeX}$  document , we need three commands :

```
%% Preamble
\usepackage{graphicx}
\graphicspath{{dir1}{dir2}...}

%% Document body
\includegraphics[options]{imagefile}
```

# Inserting images

- To insert images in a  $\text{\LaTeX}$  document , we need three commands :

```
%% Preamble
\usepackage{graphicx}
\graphicspath{{dir1}{dir2}...}

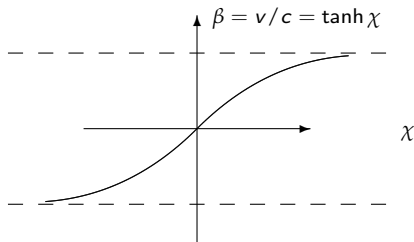
%% Document body
\includegraphics[options]{imagefile}
```

- The **graphicx** package must be loaded in the preamble.
- The `\graphicspath` command is used to specify in which directories the image files can be found.
- The `\includegraphics` command inserts the image in the document.
- The options from `\includegraphics` determine, among other things, the image's size, rotation, origin, etc. Refer to the [graphicx documentation](#) to see all available options.

# Inserting graphics

We can draw graphics in  $\text{\LaTeX}$  with the `picture` environment<sup>1</sup>.

```
\setlength{\unitlength}{1cm}
\begin{picture}(0,0)(-3,2)
\put(-1.5,0){\vector(1,0){3}}
\put(2.7,-0.1){\$\chi\$}
\put(0,-1.5){\vector(0,1){3}}
\multiput(-2.5,1)(0.4,0){13}
{\line(1,0){0.2}}
\multiput(-2.5,-1)(0.4,0){13}
{\line(1,0){0.2}}
\put(0.2,1.4)
{\$\beta=v/c=\tanh\chi\$}
\qbezier(0,0)(0.8853,0.8853)
(2,0.9640)
\qbezier(0,0)(-0.8853,-0.8853)
(-2,-0.9640)
\end{picture}
```



For a more advanced usage of graphics, you can use the **TikZ PGF** package.

1. [https://en.wikibooks.org/wiki/LaTeX/Picture#Plotting\\_graphs](https://en.wikibooks.org/wiki/LaTeX/Picture#Plotting_graphs)

# Floating images and graphics

- As for tables, it is better to let T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X determine where it is best to insert images and graphics.
- This can be done with the `figure` environment.

```
\begin{figure}[location]  
  \includegraphics[options]{file}  
  \caption{text}  
\end{figure}
```

```
\begin{figure}[location]  
  \begin{picture}(width,height)(x,y)  
    ...  
  \end{picture}  
  \caption{text}  
\end{figure}
```

# Floating images and graphics

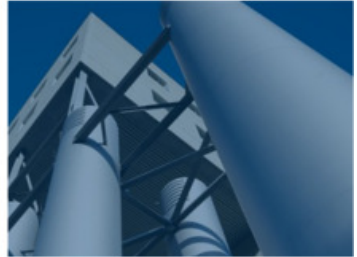
- As for tables, it is better to let T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X determine where it is best to insert images and graphics.
- This can be done with the `figure` environment.

```
\begin{figure}[location]  
  \includegraphics[options]{file}  
  \caption{text}  
\end{figure}
```

```
\begin{figure}[location]  
  \begin{picture}(width,height)(x,y)  
    ...  
  \end{picture}  
  \caption{text}  
\end{figure}
```

- The optional `location` argument takes the options values as `table : t,b,p,h`.
- `\caption` inserts a captions below of above an image or graphic.
- `\listoffigures` generates a list of all the `figure` environments inserted in the text.

# Maths



# Maths in $\text{\LaTeX}$

## Introduction

- Maths are **THE** reason why  $\text{\TeX}$  exists.  $\text{\TeX}$  exists because it is otherwise very difficult to render complex equations in a document.
- The *American Mathematical Society* supports  $\text{\TeX}$  and  $\text{\LaTeX}$  from the beginning. It has built numerous packages to facilitate the writing and rendering of maths.
- An **essential** package that you **have to use** is `amsmath`.
- $\text{\LaTeX}$  takes care of all typographic conventions :
  - constants vs variables, equation layout and numbering ;
  - spaces between symbols and operators.
- To use maths in  $\text{\LaTeX}$ , you have to put it in “Math Mode”.





Math Modes



**HEC MONTRÉAL**

# Math Modes

There are two ways of writing equations in  $\text{\LaTeX}$  :

- 1 “Inline”, directly in the text like  $(a + b)^2 = a^2 + 2ab + b^2$  by placing the equation between  $\$$  and  $\$$ .

“Inline”, directly in the text like  $(a + b)^2 = a^2 + 2ab + b^2$  by placing the equations between  $\$$  and  $\$$ .

- 2 In their own “paragraph”, separated from the text like

$$\int_0^{\infty} f(x) dx = \sum_{i=1}^n \alpha_i e^{x_i} f(x_i)$$

by using different types of environments.

In their own “paragraph”, separated from the text like

```
\begin{equation*}
\int_0^{\infty} f(x) \, dx =
\sum_{i=1}^n \alpha_i e^{x_i} f(x_i)
\end{equation*}
```

by using different types of environments.

# Math Environments

## $\text{\LaTeX}$ Standard Environments

There are several  $\text{\LaTeX}$  environments you can use to write equations :

- One-line equations :

```
\begin{displaymath} equation \dots \end{displaymath}
\begin{equation} equation \dots \end{equation}
\begin{equation*} equation \dots \end{equation*}
```

- Multiline equations :

```
\begin{eqnarray} equation \dots \end{eqnarray}
\begin{eqnarray*} equation \dots \end{eqnarray*}
```

# Math Environments

## $\text{\LaTeX}$ Standard Environments

There are several  $\text{\LaTeX}$  environments you can use to write equations :

- One-line equations :

```
\begin{displaymath} equation ... \end{displaymath}  
\begin{equation} equation ... \end{equation}  
\begin{equation*} equation ... \end{equation*}
```

- Multiline equations :

```
\begin{eqnarray} equation ... \end{eqnarray}  
\begin{eqnarray*} equation ... \end{eqnarray*}
```

For multiline equations, you should use the **amsmath** package's environments. They are more versatile, easier to use and they give a better rendering of equations.

# Math Environments

`amsmath` package's Environments

<code>multline, multline*</code>	For single equations too long to fit on one line.
<code>align, align*</code>	For multiple equations aligned on a single marker (usually the <code>=</code> sign).
<code>gather, gather*</code>	For multiple equations, horizontally centered.
<code>falign, falign*</code>	Like <code>align</code> , but separates both sides of the equation to fit the line width.
<code>alignat, alignat*</code>	The opposite of <code>falign</code> : no space separates both sides of the equation.
<code>split</code>	For single equations too long to fit on one line ; allows the alignment of the equation on a single marker.

# Math Environments

## Examples

```
\begin{equation}  
  a = b  
\end{equation}
```

$$a = b \quad (1)$$

```
\begin{equation*}  
  a = b  
\end{equation*}
```

$$a = b$$

```
\begin{multline}  
  a + b + c + d + e + f \\  
  + i + j + k + l + m + n  
\end{multline}
```

$$a + b + c + d + e + f$$

$$+ o + p + q + r + s + t \quad (2)$$

# Math Environments

## Examples

```
\begin{align}  
  a_1 &= b_1 + c_1 \\  
  a_2 &= b_2 + c_2 - d_2 + e_2  
\end{align}
```

$$a_1 = b_1 + c_1 \tag{3}$$

$$a_2 = b_2 + c_2 - d_2 + e_2 \tag{4}$$

```
\begin{gather}  
  a_1 = b_1 + c_1 \\  
  a_2 = b_2 + c_2 - d_2 + e_2  
\end{gather}
```

$$a_1 = b_1 + c_1 \tag{5}$$

$$a_2 = b_2 + c_2 - d_2 + e_2 \tag{6}$$

# Math Environments

## Examples

```
\begin{equation}
\begin{split}
a &= b + c - d \\
&\phantom{=} + e - f \\
&= g + h \\
&= i
\end{split}
\end{equation}
```

$$\begin{aligned} a &= b + c - d \\ &\quad + e - f \\ &= g + h \\ &= i \end{aligned} \tag{7}$$





the 1990s, the number of people in the United States who are 65 years of age or older has increased by 50 percent, and the number of people 75 years of age or older has increased by 100 percent. The number of people 85 years of age or older has increased by 200 percent. The number of people 95 years of age or older has increased by 400 percent. The number of people 100 years of age or older has increased by 1,000 percent. The number of people 105 years of age or older has increased by 2,000 percent. The number of people 110 years of age or older has increased by 4,000 percent. The number of people 115 years of age or older has increased by 8,000 percent. The number of people 120 years of age or older has increased by 16,000 percent. The number of people 125 years of age or older has increased by 32,000 percent. The number of people 130 years of age or older has increased by 64,000 percent. The number of people 135 years of age or older has increased by 128,000 percent. The number of people 140 years of age or older has increased by 256,000 percent. The number of people 145 years of age or older has increased by 512,000 percent. The number of people 150 years of age or older has increased by 1,024,000 percent. The number of people 155 years of age or older has increased by 2,048,000 percent. The number of people 160 years of age or older has increased by 4,096,000 percent. The number of people 165 years of age or older has increased by 8,192,000 percent. The number of people 170 years of age or older has increased by 16,384,000 percent. The number of people 175 years of age or older has increased by 32,768,000 percent. The number of people 180 years of age or older has increased by 65,536,000 percent. The number of people 185 years of age or older has increased by 131,072,000 percent. The number of people 190 years of age or older has increased by 262,144,000 percent. The number of people 195 years of age or older has increased by 524,288,000 percent. The number of people 200 years of age or older has increased by 1,048,576,000 percent. The number of people 205 years of age or older has increased by 2,097,152,000 percent. The number of people 210 years of age or older has increased by 4,194,304,000 percent. The number of people 215 years of age or older has increased by 8,388,608,000 percent. The number of people 220 years of age or older has increased by 16,777,216,000 percent. The number of people 225 years of age or older has increased by 33,554,432,000 percent. The number of people 230 years of age or older has increased by 67,108,864,000 percent. The number of people 235 years of age or older has increased by 134,217,728,000 percent. The number of people 240 years of age or older has increased by 268,435,456,000 percent. The number of people 245 years of age or older has increased by 536,870,912,000 percent. The number of people 250 years of age or older has increased by 1,073,741,824,000 percent. The number of people 255 years of age or older has increased by 2,147,483,648,000 percent. The number of people 260 years of age or older has increased by 4,294,967,296,000 percent. The number of people 265 years of age or older has increased by 8,589,934,592,000 percent. The number of people 270 years of age or older has increased by 17,179,869,184,000 percent. The number of people 275 years of age or older has increased by 34,359,738,368,000 percent. The number of people 280 years of age or older has increased by 68,719,476,736,000 percent. The number of people 285 years of age or older has increased by 137,438,953,472,000 percent. The number of people 290 years of age or older has increased by 274,877,906,944,000 percent. The number of people 295 years of age or older has increased by 549,755,813,888,000 percent. The number of people 300 years of age or older has increased by 1,099,511,627,776,000 percent. The number of people 305 years of age or older has increased by 2,199,023,255,552,000 percent. The number of people 310 years of age or older has increased by 4,398,046,511,104,000 percent. The number of people 315 years of age or older has increased by 8,796,093,022,208,000 percent. The number of people 320 years of age or older has increased by 17,592,186,044,416,000 percent. The number of people 325 years of age or older has increased by 35,184,372,088,832,000 percent. The number of people 330 years of age or older has increased by 70,368,744,177,664,000 percent. The number of people 335 years of age or older has increased by 140,737,488,355,328,000 percent. The number of people 340 years of age or older has increased by 281,474,976,710,656,000 percent. The number of people 345 years of age or older has increased by 562,949,953,421,312,000 percent. The number of people 350 years of age or older has increased by 1,125,899,906,842,624,000 percent. The number of people 355 years of age or older has increased by 2,251,799,813,685,248,000 percent. The number of people 360 years of age or older has increased by 4,503,599,627,370,496,000 percent. The number of people 365 years of age or older has increased by 9,007,199,254,740,992,000 percent. The number of people 370 years of age or older has increased by 18,014,398,509,481,984,000 percent. The number of people 375 years of age or older has increased by 36,028,797,018,963,968,000 percent. The number of people 380 years of age or older has increased by 72,057,594,037,927,936,000 percent. The number of people 385 years of age or older has increased by 144,115,188,075,855,872,000 percent. The number of people 390 years of age or older has increased by 288,230,376,151,711,744,000 percent. The number of people 395 years of age or older has increased by 576,460,752,303,423,488,000 percent. The number of people 400 years of age or older has increased by 1,152,921,504,606,846,976,000 percent. The number of people 405 years of age or older has increased by 2,305,843,009,213,693,952,000 percent. The number of people 410 years of age or older has increased by 4,611,686,018,427,387,904,000 percent. The number of people 415 years of age or older has increased by 9,223,372,036,854,775,808,000 percent. The number of people 420 years of age or older has increased by 18,446,744,073,709,551,616,000 percent. The number of people 425 years of age or older has increased by 36,893,488,147,419,103,232,000 percent. The number of people 430 years of age or older has increased by 73,786,976,294,838,206,464,000 percent. The number of people 435 years of age or older has increased by 147,573,952,589,676,412,928,000 percent. The number of people 440 years of age or older has increased by 295,147,905,179,352,825,856,000 percent. The number of people 445 years of age or older has increased by 590,295,810,358,705,651,712,000 percent. The number of people 450 years of age or older has increased by 1,180,591,620,717,411,303,424,000 percent. The number of people 455 years of age or older has increased by 2,361,183,241,434,822,606,848,000 percent. The number of people 460 years of age or older has increased by 4,722,366,482,869,645,213,696,000 percent. The number of people 465 years of age or older has increased by 9,444,732,965,739,290,427,392,000 percent. The number of people 470 years of age or older has increased by 18,889,465,931,478,580,854,784,000 percent. The number of people 475 years of age or older has increased by 37,778,931,862,957,161,709,568,000 percent. The number of people 480 years of age or older has increased by 75,557,863,725,914,323,419,136,000 percent. The number of people 485 years of age or older has increased by 151,115,727,451,828,646,838,272,000 percent. The number of people 490 years of age or older has increased by 302,231,454,903,657,293,676,544,000 percent. The number of people 495 years of age or older has increased by 604,462,909,807,314,587,353,088,000 percent. The number of people 500 years of age or older has increased by 1,208,925,819,614,629,174,706,176,000 percent. The number of people 505 years of age or older has increased by 2,417,851,639,229,258,349,412,352,000 percent. The number of people 510 years of age or older has increased by 4,835,703,278,458,516,698,824,704,000 percent. The number of people 515 years of age or older has increased by 9,671,406,556,917,033,397,649,408,000 percent. The number of people 520 years of age or older has increased by 19,342,813,113,834,066,795,298,816,000 percent. The number of people 525 years of age or older has increased by 38,685,626,227,668,133,590,597,632,000 percent. The number of people 530 years of age or older has increased by 77,371,252,455,336,267,181,195,264,000 percent. The number of people 535 years of age or older has increased by 154,742,504,910,672,534,362,390,528,000 percent. The number of people 540 years of age or older has increased by 309,485,009,821,345,068,724,781,056,000 percent. The number of people 545 years of age or older has increased by 618,970,019,642,690,137,449,562,112,000 percent. The number of people 550 years of age or older has increased by 1,237,940,039,285,380,274,899,124,224,000 percent. The number of people 555 years of age or older has increased by 2,475,880,078,570,760,549,798,248,448,000 percent. The number of people 560 years of age or older has increased by 4,951,760,157,141,521,099,596,496,896,000 percent. The number of people 565 years of age or older has increased by 9,903,520,314,283,042,199,193,993,792,000 percent. The number of people 570 years of age or older has increased by 19,807,040,628,566,084,398,387,



# Main elements of Math Mode

- Basic math symbols : + - = < > / : ! ' | [ ] ( ) { }
- Exponents are written with ^ .  $x^2$  becomes  $x^2$ .
- Indices are written with the underscore \_ .  $a_n$  becomes  $a_n$ .
- Exponents and indices can be combined :  $x_i^k$  becomes  $x_i^k$ .
- Exponents and indices can be grouped with { and } .  $A_{i_s, k^n}^{y_i}$  becomes  $A_{i_s, k^n}^{y_i}$ .

# Fractions

- Fractions are written with `\frac{numerator}{denominator}` .

```
% Fraction size inside text  
Let $z_1 = \frac{x}{y}$ and  
$z_2 = xy$...
```

Let  $z_1 = \frac{x}{y}$  and  $z_2 = xy...$

# Fractions

- Fractions are written with `\frac{numerator}{denominator}` .

```
% Fraction size inside text
Let $z_1 = \frac{x}{y}$ and
$z_2 = xy$...
```

Let  $z_1 = \frac{x}{y}$  and  $z_2 = xy...$

```
% Fraction size outside text
Let
\begin{equation*}
z_1 = \frac{x}{y}
\end{equation*}
and $z_2 = xy$...
```

Let

$$z_1 = \frac{x}{y}$$

and  $z_2 = xy...$

# Fractions

- Fractions are written with `\frac{numerator}{denominator}` .

```
% Fraction size inside text
Let $z_1 = \frac{x}{y}$ and
$z_2 = xy$...
```

Let  $z_1 = \frac{x}{y}$  and  $z_2 = xy...$

```
% Fraction size outside text
Let
\begin{equation*}
z_1 = \frac{x}{y}
\end{equation*}
and $z_2 = xy$...
```

Let

$$z_1 = \frac{x}{y}$$

and  $z_2 = xy...$

```
% Combined sizes
Let
\begin{equation*}
z = \frac{\frac{x}{2} + 1}{y}.
\end{equation*}
```

Let

$$z = \frac{\frac{x}{2} + 1}{y}.$$

# Roots

- Roots are written with `\sqrt[n]{arg}` .
  - The default root (if `n` as not been defined) is the square root.
  - The root sign is automatically fitted to `arg`.

```
\sqrt{2}
```

$$\sqrt{2}$$

```
\sqrt{625}
```

$$\sqrt{625}$$

```
\sqrt[3]{8}
```

$$\sqrt[3]{8}$$

```
\sqrt[n]{x + y + z}
```

$$\sqrt[n]{x + y + z}$$

```
\sqrt{\frac{x + y}{x^2 - y^2}}
```

$$\sqrt{\frac{x + y}{x^2 - y^2}}$$

# Sums and Integrals

- Sums are written with `\sum`.
- Integrals are written with `\int`
- Lower and upper limits are written with indices (`_`) and exponents (`^`).

```
\sum_{i = 0}^n x_i
```

$$\sum_{i=0}^n x_i$$

```
\int_0^{10} f(x) \, dx
```

$$\int_0^{10} f(x) \, dx$$

- The **amsmath** package also provides the `\iint` and `\iiint` to generate multiple integrals like  $\iint$  and  $\iiint$ .

# Functions, operators, etc.

Since in Math Mode letters are considered variables, we can't manually write functions.  $\text{\LaTeX}$  defines commands for these functions :

<code>\arccos</code>	<code>\cosh</code>	<code>\det</code>	<code>\inf</code>	<code>\limsup</code>	<code>\Pr</code>	<code>\tan</code>
<code>\arcsin</code>	<code>\cot</code>	<code>\dim</code>	<code>\ker</code>	<code>\ln</code>	<code>\sec</code>	<code>\tanh</code>
<code>\arctan</code>	<code>\coth</code>	<code>\exp</code>	<code>\lg</code>	<code>\log</code>	<code>\sin</code>	
<code>\arg</code>	<code>\csc</code>	<code>\gcd</code>	<code>\lim</code>	<code>\max</code>	<code>\sinh</code>	
<code>\cos</code>	<code>\deg</code>	<code>\hom</code>	<code>\liminf</code>	<code>\min</code>	<code>\sup</code>	



# Functions, operators, etc.

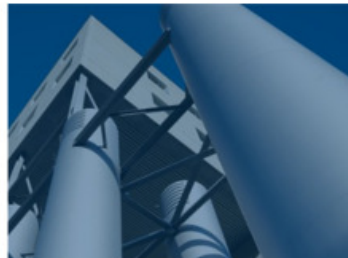
Since in Math Mode letters are considered variables, we can't manually write functions.  $\text{\LaTeX}$  defines commands for these functions :

<code>\arccos</code>	<code>\cosh</code>	<code>\det</code>	<code>\inf</code>	<code>\limsup</code>	<code>\Pr</code>	<code>\tan</code>
<code>\arcsin</code>	<code>\cot</code>	<code>\dim</code>	<code>\ker</code>	<code>\ln</code>	<code>\sec</code>	<code>\tanh</code>
<code>\arctan</code>	<code>\coth</code>	<code>\exp</code>	<code>\lg</code>	<code>\log</code>	<code>\sin</code>	
<code>\arg</code>	<code>\csc</code>	<code>\gcd</code>	<code>\lim</code>	<code>\max</code>	<code>\sinh</code>	
<code>\cos</code>	<code>\deg</code>	<code>\hom</code>	<code>\liminf</code>	<code>\min</code>	<code>\sup</code>	

There are also commands for **greek letters**, **text** and **spaces**, **continuation dots**, **calligraphic letters**, **binary operators** and **relations**, **arrows**, **accents** and many more !

Refer to the **amsmath** package documentation and the [Comprehensive  \$\text{\LaTeX}\$  Symbol List](#) – 338 pages of pleasant reading! – to learn about all the functionalities.

# Bibliographies and citations





the 1990s, the number of people in the United States who are 65 years of age or older has increased by 50 percent, and the number of people 75 years of age or older has increased by 100 percent. The number of people 85 years of age or older has increased by 200 percent. The number of people 95 years of age or older has increased by 400 percent. The number of people 100 years of age or older has increased by 1,000 percent. The number of people 105 years of age or older has increased by 2,000 percent. The number of people 110 years of age or older has increased by 4,000 percent. The number of people 115 years of age or older has increased by 8,000 percent. The number of people 120 years of age or older has increased by 16,000 percent. The number of people 125 years of age or older has increased by 32,000 percent. The number of people 130 years of age or older has increased by 64,000 percent. The number of people 135 years of age or older has increased by 128,000 percent. The number of people 140 years of age or older has increased by 256,000 percent. The number of people 145 years of age or older has increased by 512,000 percent. The number of people 150 years of age or older has increased by 1,024,000 percent. The number of people 155 years of age or older has increased by 2,048,000 percent. The number of people 160 years of age or older has increased by 4,096,000 percent. The number of people 165 years of age or older has increased by 8,192,000 percent. The number of people 170 years of age or older has increased by 16,384,000 percent. The number of people 175 years of age or older has increased by 32,768,000 percent. The number of people 180 years of age or older has increased by 65,536,000 percent. The number of people 185 years of age or older has increased by 131,072,000 percent. The number of people 190 years of age or older has increased by 262,144,000 percent. The number of people 195 years of age or older has increased by 524,288,000 percent. The number of people 200 years of age or older has increased by 1,048,576,000 percent. The number of people 205 years of age or older has increased by 2,097,152,000 percent. The number of people 210 years of age or older has increased by 4,194,304,000 percent. The number of people 215 years of age or older has increased by 8,388,608,000 percent. The number of people 220 years of age or older has increased by 16,777,216,000 percent. The number of people 225 years of age or older has increased by 33,554,432,000 percent. The number of people 230 years of age or older has increased by 67,108,864,000 percent. The number of people 235 years of age or older has increased by 134,217,728,000 percent. The number of people 240 years of age or older has increased by 268,435,456,000 percent. The number of people 245 years of age or older has increased by 536,870,912,000 percent. The number of people 250 years of age or older has increased by 1,073,741,824,000 percent. The number of people 255 years of age or older has increased by 2,147,483,648,000 percent. The number of people 260 years of age or older has increased by 4,294,967,296,000 percent. The number of people 265 years of age or older has increased by 8,589,934,592,000 percent. The number of people 270 years of age or older has increased by 17,179,869,184,000 percent. The number of people 275 years of age or older has increased by 34,359,738,368,000 percent. The number of people 280 years of age or older has increased by 68,719,476,736,000 percent. The number of people 285 years of age or older has increased by 137,438,953,472,000 percent. The number of people 290 years of age or older has increased by 274,877,906,944,000 percent. The number of people 295 years of age or older has increased by 549,755,813,888,000 percent. The number of people 300 years of age or older has increased by 1,099,511,627,776,000 percent. The number of people 305 years of age or older has increased by 2,199,023,255,552,000 percent. The number of people 310 years of age or older has increased by 4,398,046,511,104,000 percent. The number of people 315 years of age or older has increased by 8,796,093,022,208,000 percent. The number of people 320 years of age or older has increased by 17,592,186,044,416,000 percent. The number of people 325 years of age or older has increased by 35,184,372,088,832,000 percent. The number of people 330 years of age or older has increased by 70,368,744,177,664,000 percent. The number of people 335 years of age or older has increased by 140,737,488,355,328,000 percent. The number of people 340 years of age or older has increased by 281,474,976,710,656,000 percent. The number of people 345 years of age or older has increased by 562,949,953,421,312,000 percent. The number of people 350 years of age or older has increased by 1,125,899,906,842,624,000 percent. The number of people 355 years of age or older has increased by 2,251,799,813,685,248,000 percent. The number of people 360 years of age or older has increased by 4,503,599,627,370,496,000 percent. The number of people 365 years of age or older has increased by 9,007,199,254,740,992,000 percent. The number of people 370 years of age or older has increased by 18,014,398,509,481,984,000 percent. The number of people 375 years of age or older has increased by 36,028,797,018,963,968,000 percent. The number of people 380 years of age or older has increased by 72,057,594,037,927,936,000 percent. The number of people 385 years of age or older has increased by 144,115,188,075,855,872,000 percent. The number of people 390 years of age or older has increased by 288,230,376,151,711,744,000 percent. The number of people 395 years of age or older has increased by 576,460,752,303,423,488,000 percent. The number of people 400 years of age or older has increased by 1,152,921,504,606,846,976,000 percent. The number of people 405 years of age or older has increased by 2,305,843,009,213,693,952,000 percent. The number of people 410 years of age or older has increased by 4,611,686,018,427,387,904,000 percent. The number of people 415 years of age or older has increased by 9,223,372,036,854,775,808,000 percent. The number of people 420 years of age or older has increased by 18,446,744,073,709,551,616,000 percent. The number of people 425 years of age or older has increased by 36,893,488,147,419,103,232,000 percent. The number of people 430 years of age or older has increased by 73,786,976,294,838,206,464,000 percent. The number of people 435 years of age or older has increased by 147,573,952,589,676,412,928,000 percent. The number of people 440 years of age or older has increased by 295,147,905,179,352,825,856,000 percent. The number of people 445 years of age or older has increased by 590,295,810,358,705,651,712,000 percent. The number of people 450 years of age or older has increased by 1,180,591,620,717,411,303,424,000 percent. The number of people 455 years of age or older has increased by 2,361,183,241,434,822,606,848,000 percent. The number of people 460 years of age or older has increased by 4,722,366,482,869,645,213,696,000 percent. The number of people 465 years of age or older has increased by 9,444,732,965,739,290,427,392,000 percent. The number of people 470 years of age or older has increased by 18,889,465,931,478,580,854,784,000 percent. The number of people 475 years of age or older has increased by 37,778,931,862,957,161,709,568,000 percent. The number of people 480 years of age or older has increased by 75,557,863,725,914,323,419,136,000 percent. The number of people 485 years of age or older has increased by 151,115,727,451,828,646,838,272,000 percent. The number of people 490 years of age or older has increased by 302,231,454,903,657,293,676,544,000 percent. The number of people 495 years of age or older has increased by 604,462,909,807,314,587,353,088,000 percent. The number of people 500 years of age or older has increased by 1,208,925,819,614,629,174,706,176,000 percent. The number of people 505 years of age or older has increased by 2,417,851,639,229,258,349,412,352,000 percent. The number of people 510 years of age or older has increased by 4,835,703,278,458,516,698,824,704,000 percent. The number of people 515 years of age or older has increased by 9,671,406,556,917,033,397,649,408,000 percent. The number of people 520 years of age or older has increased by 19,342,813,113,834,066,795,298,816,000 percent. The number of people 525 years of age or older has increased by 38,685,626,227,668,133,590,597,632,000 percent. The number of people 530 years of age or older has increased by 77,371,252,455,336,267,181,195,264,000 percent. The number of people 535 years of age or older has increased by 154,742,504,910,672,534,362,390,528,000 percent. The number of people 540 years of age or older has increased by 309,485,009,821,345,068,724,781,056,000 percent. The number of people 545 years of age or older has increased by 618,970,019,642,690,137,449,562,112,000 percent. The number of people 550 years of age or older has increased by 1,237,940,039,285,380,274,899,124,224,000 percent. The number of people 555 years of age or older has increased by 2,475,880,078,570,760,549,798,248,448,000 percent. The number of people 560 years of age or older has increased by 4,951,760,157,141,521,099,596,496,896,000 percent. The number of people 565 years of age or older has increased by 9,903,520,314,283,042,199,193,993,792,000 percent. The number of people 570 years of age or older has increased by 19,807,040,628,566,084,398,387,

# Manual bibliographies

- We can manually write our bibliography with the thebibliography environment.

```
\begin{thebibliography}{\longest label}  
  \bibitem[label]{id_citation} Bibliographic entry #1  
  \bibitem[label]{id_citation} Bibliographic entry #2  
  [...]  
\end{thebibliography}
```

# Manual bibliographies

- We can manually write our bibliography with the `thebibliography` environment.

```
\begin{thebibliography}{longest label}  
  \bibitem[label]{id_citation} Bibliographic entry #1  
  \bibitem[label]{id_citation} Bibliographic entry #2  
  [...]  
\end{thebibliography}
```

- Each bibliographic entry is written with the `\bibitem` command.
  - The `label` is what we'll find as reference in the text. If there is no label,  $\text{\LaTeX}$  will insert a sequential number.
  - `id_citation` is what is used to cite a bibliographic entry.
  - The `bibliographic` entry contains all information concerning the source.

# Manual bibliographies

- We can manually write our bibliography with the `thebibliography` environment.

```
\begin{thebibliography}{longest label}  
  \bibitem[label]{id_citation} Bibliographic entry #1  
  \bibitem[label]{id_citation} Bibliographic entry #2  
  [...]  
\end{thebibliography}
```

- Each bibliographic entry is written with the `\bibitem` command.
  - The `label` is what we'll find as reference in the text. If there is no label,  $\text{\LaTeX}$  will insert a sequential number.
  - `id_citation` is what is used to cite a bibliographic entry.
  - The `bibliographic` entry contains all information concerning the source.
- The `longest label` at the beginning of the environment is the longest of all labels found in the `bibitems`.
- The bibliography is inserted in the document where the `thebibliography` environment has been inserted in the code.

# Manual bibliographies

## Example

```
\begin{thebibliography}{99}
\bibitem[Kopka and Daly, 2004]{kopkadaly:2004}
  Kopka, Helmut and Patrick W. Daly (2004).
  \newblock Guide to \LaTeX, Fourth Edition,
  \newblock Addison-Wesley,
  \newblock ISBN 978-0-321-17385-0, 597 p.
\bibitem[Mittelbach et al., 2004]{mittelbach:2004}
  Mittelbach, Frank \emph{et al.} (2004).
  \newblock The \LaTeX\ Companion, Second Edition,
  \newblock Addison-Wesley,
  \newblock ISBN 978-0201362992, 1120p.
\bibitem[Goossens and Mittelbach, 2007]{goossens:2007}
  Goossens, Michel and Franck Mittelbach (2007).
  \newblock The \LaTeX\ Graphics Companion, Second Edition,
  \newblock Addison-Wesley,
  \newblock ISBN 978-0321508928, 976p.
\end{thebibliography}
```

# Automatic Bibliographies

## An introduction to BiB<sub>T</sub>E<sub>X</sub>

- BiB<sub>T</sub>E<sub>X</sub> is a L<sup>A</sup>T<sub>E</sub>X auxiliary program (compiler) that automatically builds a bibliography using a database.
- It is the *de facto* standard system for building bibliographies.
- It is stable and simple to use.
- It usually is the only format accepted by scientific journals.
- You can export your bibliographic entries from **EndNote** to BiB<sub>T</sub>E<sub>X</sub>.
- You can download references in BiB<sub>T</sub>E<sub>X</sub> format from HEC<sub>o</sub>, Google Scholar, ProQuest, Ebsco and many more databases found at the Library.



# Compiling a document with BiBTeX

- In the previous training session, we have schematized a document's compilation as such :



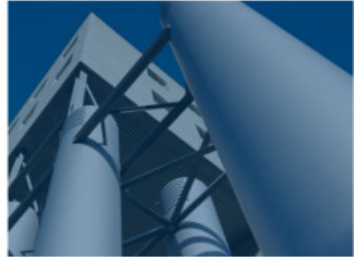
# Compiling a document with BiBTeX

- In the previous training session, we have schematized a document's compilation as such :



- With BiBTeX, the compilation sequence changes :





## Creating a Bibliography



**HEC MONTRÉAL**

# Creating a Database

The first thing to do is to create a database of references that is going to be stored in a .bib file.

*% Example taken from bibliography.bib*

```
@article{amaralcardiac2014,  
  author = {Amaral, Joice Anaize Tonon do and Nogueira, Marcela Leme and Roque, Adriano L  
    and Guida, Heraldo Lorena and Abreu, Luiz Carlos de and Raimundo, Rodrigo Daminello  
    and Vanderlei, Luiz Carlos Marques and Ribeiro, Vivian F and Ferreira, Celso and  
    Valenti, Vitor Engrácia},  
  title = {Cardiac autonomic regulation during exposure to auditory stimulation with classical  
    baroque or heavy metal music of different intensities},  
  journal = {Archives of the Turkish Society of Cardiology},  
  pages = {139–146},  
  ISSN = {1016–5169},  
  year = {2014},  
  type = {Journal Article}  
}  
  
@article{mobergfaster2009,  
  author = {Moberg, Marcus},  
  title = {Faster for the master!: exploring issues of religious expression and alternative  
    Christian identity within the Finnish Christian metal music scene},  
  year = {2009},  
  type = {Journal Article}  
}
```

# natbib Package

- By default,  $\text{\LaTeX}$  only supports numerical citations.
- The citation format used in science in general, and at HEC Montréal particularly, is the *author, year* format.
- The **natbib** package allows the use of the *author, year* format.

# natbib Package

- By default,  $\text{\LaTeX}$  only supports numerical citations.
- The citation format used in science in general, and at HEC Montréal particularly, is the *author, year* format.
- The **natbib** package allows the use of the *author, year* format.

```
\documentclass[english , french]{hecthesse}  
  
\usepackage[utf8]{inputenc}  
\usepackage[T1]{fontenc}  
\usepackage{babel}  
\usepackage[autolanguage]{numprint}  
\usepackage{icomma}  
\usepackage{natbib}  
\usepackage{hyperref}  
  
\begin{document}  
  content ...  
\end{document}
```

- natbib must **absolutely** be loaded **after** babel.

# Inserting a Bibliography

- Before inserting our bibliography in our document, we have to tell BiB<sub>T</sub>E<sub>X</sub> in which bibliographic style we want our references to be displayed.

```
\bibliographystyle{style}
```

# Inserting a Bibliography

- Before inserting our bibliography in our document, we have to tell BiB<sub>T</sub>E<sub>X</sub> in which bibliographic style we want our references to be displayed.

```
\bibliographystyle{style}
```

- Not all bibliographic styles are compatible with the *author, year* citation format.
  - Use the `francais` style if you write in French ;
  - Use the `apalike` style if you write in English.

```
% Writing in French  
\bibliographystyle{francais}
```

```
% Writing in English  
\bibliographystyle{apalike}
```

- These two styles resemble most HEC Montréal's style.



# Inserting a Bibliography

- Before inserting our bibliography in our document, we have to tell BiB<sub>T</sub>E<sub>X</sub> in which bibliographic style we want our references to be displayed.

```
\bibliographystyle{style}
```

- Not all bibliographic styles are compatible with the *author, year* citation format.
  - Use the `francais` style if you write in French ;
  - Use the `apalike` style if you write in English.

```
% Writing in French
\bibliographystyle{francais}

% Writing in English
\bibliographystyle{apalike}
```

- These two styles resemble most HEC Montréal's style.
- Once we have chosen our bibliographic style, we can insert our bibliography.

```
\bibliographystyle{apalike}
\bibliography{bibfile} % Name of .bib file between curly braces , with the file extension
```



# Referring to sources

- There are three ways to cite bibliographic entries, two of them coming from the **natbib** package :

<code>\cite[extra]{id_citation}</code>	Numerical citation
<code>\citet[extra]{id_citation}</code>	Inline citation
<code>\citep[extra]{id_citation}</code>	Citation between parentheses

- The `id_citation` argument is what is used to identify a bibliographic entry.
- The optional `extra` argument allows us to insert extra information after the citation, e.g. a page number.
- We advise you to use the `\citet` and `\citep` commands, which are more descriptive.

# Citation examples

Look at the following bibliographic entry :

```
\bibitem{jones99}  
F. J. Jones, H. P. Baker, and W. V. Toms, [...] 1999.
```

This is what each of the citation commands' output looks like :

# Citation examples

Look at the following bibliographic entry :

```
\bibitem{jones99}  
F. J. Jones, H. P. Baker, and W. V. Toms, [...] 1999.
```

This is what each of the citation commands' output looks like :

```
I am so proud that someone thinks exactly  
like me\cite{jones99}\ldots
```

I am so proud that someone thinks exactly like me[1]...

```
I am so proud that someone thinks exactly  
like me\cite[p.22]{jones99}\ldots
```

I am so proud that someone thinks exactly like me[1,  
p.22]...

# Citation examples

Look at the following bibliographic entry :

```
\bibitem{jones99}
F. J. Jones, H. P. Baker, and W. V. Toms, [...] 1999.
```

This is what each of the citation commands' output looks like :

```
I am so proud that someone thinks exactly
like me\cite{jones99}\ldots
```

I am so proud that someone thinks exactly like me[1]...

```
I am so proud that someone thinks exactly
like me\cite[p.22]{jones99}\ldots
```

I am so proud that someone thinks exactly like me[1, p.22]...

```
I am so proud that \citet{jones99}
thinks exactly like me\ldots
```

I am so proud that Jones et al., (1999) thinks exactly like me...

```
I am so proud that \citet[p.22]{jones99}
thinks exactly like me\ldots
```

I am so proud that Jones et al., (1999, p.22) thinks exactly like me...

# Citation examples

Look at the following bibliographic entry :

```
\bibitem{jones99}
  F. J. Jones, H. P. Baker, and W. V. Toms, [...] 1999.
```

This is what each of the citation commands' output looks like :

```
I am so proud that someone thinks exactly
like me\cite{jones99}\ldots
```

I am so proud that someone thinks exactly like me[1]...

```
I am so proud that someone thinks exactly
like me\cite[p.22]{jones99}\ldots
```

I am so proud that someone thinks exactly like me[1, p.22]...

```
I am so proud that \citet{jones99}
thinks exactly like me\ldots
```

I am so proud that Jones et al., (1999) thinks exactly like me...

```
I am so proud that \citet[p.22]{jones99}
thinks exactly like me\ldots
```

I am so proud that Jones et al., (1999, p.22) thinks exactly like me...

```
I am so proud that someone thinks exactly
like me\citep{jones99}\ldots
```

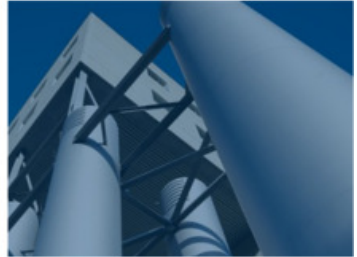
I am so proud that someone thinks exactly like me (Jones et al., 1999)...

```
I am so proud that someone thinks exactly
like me\citep[p.22]{jones99}\ldots
```

I am so proud that someone thinks exactly like me (Jones et al., 1999, p.22)...



# Bibliography





# Bibliography

For those who still prefer the scent of ink



Kopka, Helmut and Patrick W. Daly (2004).  
Guide to  $\text{\LaTeX}$ , Fourth Edition,  
Addison-Wesley,  
ISBN 978-0-321-17385-0, 597 p.



Mittelbach, Frank *et al.* (2004).  
The  $\text{\LaTeX}$  Companion, Second Edition,  
Addison-Wesley,  
ISBN 978-0201362992, 1120p.



Goossens, Michel and Franck Mittelbach (2007).  
The  $\text{\LaTeX}$  Graphics Companion, Second Edition,  
Addison-Wesley,  
ISBN 978-0321508928, 976p.

# Bibliography

For the environmentally conscious



Goulet, Vincent (2016).  
formation-latex-ul – Introductory L<sup>A</sup>T<sub>E</sub>X course in French,  
Comprehensive T<sub>E</sub>X Archive Network,  
Viewed on February 22, 2018 at <https://ctan.org/pkg/formation-latex-ul>



Lees-Miller, John D. (2018).  
Free & Interactive Online Introduction to L<sup>A</sup>T<sub>E</sub>X,  
Overleaf,  
Viewed on February 22, 2018 at  
<https://www.overleaf.com/latex/learn/free-online-introduction-to-latex-part-1>



ShareL<sup>A</sup>T<sub>E</sub>X Documentation,  
ShareL<sup>A</sup>T<sub>E</sub>X,  
Viewed on February 22, 2018 at [https://fr.sharelatex.com/learn/Main\\_Page](https://fr.sharelatex.com/learn/Main_Page)

# Bibliography

For the environmentally conscious

-  [L<sup>A</sup>T<sub>E</sub>X WikiBook](#)
-  [ShareL<sup>A</sup>T<sub>E</sub>X Documentation](#)
-  [T<sub>E</sub>X - L<sup>A</sup>T<sub>E</sub>X Stack Exchange](#)
-  [L<sup>A</sup>T<sub>E</sub>X Community](#)
-  [Comprehensive T<sub>E</sub>X Archive Network](#)
-  [UK List of TEX Frequently Asked Questions](#)
-  [Google...](#)

## Questions and comments

### TRAINING SESSION DOCUMENTATION

<http://bit.ly/enltxhec2>

### TRAINING SESSION EVALUATION SURVEY

<http://bit.ly/enltxsurvey2>

### T<sub>E</sub>XNICAL SUPPORT

Benoit Hamel : <benoit.2.hamel@hec.ca>