

# Linear Algebra

Introduction to  $\text{\LaTeX}$

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March 3, 2022

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## 1. Introduction to $\text{\LaTeX}$

# Introduction to $\text{\LaTeX}$

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Raw text:

$x$

Result:

$x$

Raw text:

```
$\mathbf{x}$
```

Result:

**x**

Raw text (subscript):

```
$\mathbf{x}_1$
```

Result:

$\mathbf{x}_1$

Raw text (superscript):

```
$\mathbf{x}^2$
```

Result:

$$\mathbf{x}^2$$

Raw text (fraction = numerator/denominator):

```
$\frac{1}{2}$
```

Result: 0.5 is equal to  $\frac{1}{2}$ .



Raw text:

```
\[  
A \mathbf{x} = \mathbf{b}  
\]
```

Result:

$$Ax = b$$

Raw text:

```
\begin{equation}  
A \mathbf{x} = \mathbf{b}  
\end{equation}
```

Result:

$$Ax = b \qquad (1)$$

# Introduction to L<sup>A</sup>T<sub>E</sub>X

Raw text:

```
\begin{equation}
A \mathbf{x} = \mathbf{b}
\label{eqn:a}
\end{equation}
How to solve (\ref{eqn:a})?
```

Result:

$$Ax = b \quad (2)$$

How to solve (2)?

Raw text:

```
\begin{equation*}  
A \mathbf{x} = \mathbf{b}  
\end{equation*}
```

Result:

$$Ax = b$$

Raw text:

```
\[  
\begin{bmatrix}  
a & b \\  
c & d \\  
\end{bmatrix}  
\]
```

Result:

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

Raw text:

```
\begin{itemize}  
\item A  
\item B  
\item C  
\end{itemize}
```

Result:

- A
- B
- C

# Introduction to L<sup>A</sup>T<sub>E</sub>X

Raw text:

```
\begin{center}  
\fbox{\begin{minipage}{25em}  
\footnotesize  
Minipage  
\end{minipage}}  
\end{center}
```

Result:

Minipage
----------

Raw text:

```
\[
[A \, | \, I]
\rightarrow
[E_1A \, | \, E_1I]
\rightarrow
[E_2E_1A \, | \, E_2E_1I]
\rightarrow
\cdots
\]
```

Result:

$$[A|I] \rightarrow [E_1A|E_1I] \rightarrow [E_2E_1A|E_2E_1I] \rightarrow \dots$$

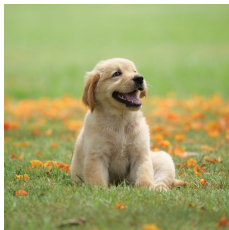


# Introduction to $\text{\LaTeX}$

Raw text:

```
\begin{figure}  
\centering  
\includegraphics[width=3.1cm]{fig/dog}  
\end{figure}
```

Result:

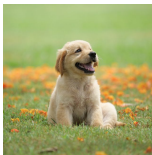


# Introduction to $\text{\LaTeX}$

Raw text:

```
\begin{figure}  
\centering  
\subfloat{ {\includegraphics[width=2cm]{fig/dog}} }  
\subfloat{ {\includegraphics[width=2cm]{fig/dog2}} }  
\subfloat{ {\includegraphics[width=3cm]{fig/dog3}} }  
\end{figure}
```

Result:



Raw text:

```
\begin{align}
y_1 &= a_{11} x_1 + a_{12} x_2 \\
y_2 &= a_{21} x_1 + a_{22} x_2
\end{align}
```

Result:

$$y_1 = a_{11}x_1 + a_{12}x_2 \tag{3}$$

$$y_2 = a_{21}x_1 + a_{22}x_2 \tag{4}$$

Raw text:

```
\begin{align*}
y_1 &= a_{11} x_1 + a_{12} x_2 \\
y_2 &= a_{21} x_1 + a_{22} x_2
\end{align*}
```

Result:

$$y_1 = a_{11}x_1 + a_{12}x_2$$

$$y_2 = a_{21}x_1 + a_{22}x_2$$

Raw text:

To use multiple lines within a line:

```

$$\begin{aligned} y_1 &= a_{11} x_1 + a_{12} x_2 \\ y_2 &= a_{21} x_1 + a_{22} x_2 \end{aligned}$$

```

Result:

To use multiple lines within a line:

$$\begin{aligned} y_1 &= a_{11}x_1 + a_{12}x_2 \\ y_2 &= a_{21}x_1 + a_{22}x_2 \end{aligned}$$

Raw text:

```
\begin{itemize}
\item  $\rightarrow$   $\Rightarrow$ 
\item  $\leftarrow$   $\Leftarrow$ 
\item  $\leftrightarrow$   $\Leftrightarrow$ 
\end{itemize}
```

Result:

- $\rightarrow \Rightarrow$
- $\leftarrow \Leftarrow$
- $\leftrightarrow \Leftrightarrow$

Raw text:

```
\begin{itemize}
\item  $\sin$   $\cos$   $\tan$ 
\item  $\min$   $\max$ 
\end{itemize}
```

Result:

- $\sin$   $\cos$   $\tan$
- $\min$   $\max$

Raw text:

```
\begin{itemize}
\item  $X$ ,  $\mathbf{x}$ 
\item  $\mathbb{R}$ ,  $\mathbb{C}$ ,  $\mathbb{R}^{N \times D}$ 
\item  $\mathbf{x} \in \mathbb{R}^D$ 
\end{itemize}
```

Result:

- $X, \mathbf{x}$
- $\mathbb{R}, \mathbb{C}, \mathbb{R}^{N \times D}$
- $\mathbf{x} \in \mathbb{R}^D$



Raw text:

```
\[  
{ x_i }  
\]
```

Result:

$$x_i$$

Raw text:

```
\[  
\{ x_i \}  
\]
```

Result:

$$\{x_i\}$$

Raw text:

```
\[  
\{ x_i \}_{i=1}^N  
\]
```

Result:

$$\{x_i\}_{i=1}^N$$

Raw text:

```
\[  
g(\frac{1}{2})  
\]
```

Result:

$$g\left(\frac{1}{2}\right)$$

Raw text:

```
\[  
g \left( f(\frac{a}{b}) \right) \right)  
\]
```

Result:

$$g\left(\frac{a}{b}\right)$$

# Introduction to $\text{\LaTeX}$

Raw text:

```
\begin{itemize}
\item Text {\bf Text} {\it Text}
\item {\color{blue} Text} {\color{red} Text}
\item {\large Text} {\normalsize Text}
\item {\small Text} {\footnotesize Text}
\end{itemize}
```

Result:

- Text **Text** *Text*
- Text Text
- Text Text
- Text Text

Raw text:

```
\begin{itemize}
\item Text \textit{Text}
\item \textbf{Text} \texttt{Text}
\end{itemize}
```

Result:

- Text *Text*
- **Text** Text

**Questions?**



