

A \LaTeX Tutorial

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What is \LaTeX ?



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Commands

```
\documentclass[12pt]{article}
```

```
% remaining preamble goes here
```

```
\begin{document}
```

```
% content goes here
```

```
\end{document}
```

Creating a title

```
\documentclass[12pt]{article}
```

```
\title{Automatic Material Classification}
```

```
\author{Unal Artan \thanks{Thank you to Natalie \& Johann}}
```

```
\date{August 24, 2021}
```

```
\begin{document}
```

```
\maketitle
```

```
...
```

Automatic Material Classification

Unal Artan *

August 24, 2021

*Thank you to Natalie & Johann

Common commands

comments

% ...

bold

`\textbf{...}`

italic

`\textit{...}` or `\emph{...}`

underline

`\underline{...}`

inline equations

$...\mathrel{=}$

block equations

$$...\mathrel{=}$$
 or
$$\left[...\right]$$

...and many more!

`\ldots`

Command	Description
<code>\vspace{...}</code>	vertical spacing
<code>\hspace{...}</code>	horizontal spacing

Dimension	Description
<code>pt</code>	point, smallest unit of measure
<code>in</code>	inch (72.27 pt)
<code>cm</code>	centimeter
<code>mm</code>	millimeter
<code>em</code>	relative to current point size (e.g., for 11pt font, <code>1em = 11pt</code>)
<code>en</code>	half the width of <code>em</code>

- Extra spaces between words are ignored
- An empty line starts a new **paragraph**
- Two backslashes (`\\`) **forces** a line break, but does not start a new paragraph (i.e., no indent)
- Periods are treated as the **end of a sentence**, unless followed by a comma or backslash (e.g., i.e.`\`)
- Tilde (`~`) inserts **non-breaking whitespace**
- **Opening quotes** are denoted by 1–2 grave accents (`'` or `"`)
- **Closing quotes** are denoted by 1–2 apostrophes (`'` or `"`)


```
\begin{itemize}
  \item Lima
  \item[-] Navy
  \item Kidney
  \begin{itemize}
    \item[yes] Bean
    \item[no] Stone
  \end{itemize}
\end{itemize}
```

- Lima
- Navy
- Kidney
 - yes Bean
 - no Stone

Lists II: Enumerate

```
\begin{enumerate}
  \item One
  \item Two
  \item Three
  \begin{enumerate}
    \item Three Eh
    \item Three Bee
  \end{enumerate}
\end{enumerate}
```

1. One
2. Two
3. Three
 - 3.a Three Eh
 - 3.b Three Bee

```
\begin{tabular}{| r | c c | }  
  \hline  
    & col1 & col2 \\  
  \hline  
row1 & r1c1 &      \\  
row2 &      & r2c2 \\  
  \hline  
\end{tabular}
```

	col1	col2
row1	r1c1	
row2		r2c2

Common Math Syntax

Description	Code	Output
subscript	<code>x_y</code>	x_y
superscript	<code>x^y</code>	x^y
grouping	<code>x^{y+z}</code>	x^{y+z}
fraction	<code>\frac{x}{y}</code>	$\frac{x}{y}$
square root	<code>\sqrt{x+y}</code>	$\sqrt{x+y}$
greek letters	<code>\alpha \beta \gamma</code>	$\alpha \beta \gamma$
spacing	<code>\; \: \,</code>	contextual

```
\begin{equation}
  \beta(s) = \int_{-\infty}^{\infty} CWT(s, \tau) \; d\tau
  \label{eq:CWTint}
\end{equation}
```

$$\beta(s) = \int_{-\infty}^{\infty} CWT(s, \tau) \, d\tau \tag{1}$$

Equation Environments II

```
\begin{equation}
\begin{split}
a_{1, X} = & a_{1,x} \cos{\alpha} \\
& - a_{1,z} \sin{\alpha}
\end{split}
\end{equation}
```

$$\begin{aligned} a_{1,X} = & a_{1,x} \cos \alpha \\ & - a_{1,z} \sin \alpha \end{aligned} \tag{2}$$

```
\begin{figure}
  \includegraphics[height=0.65\textheight]{%
    figures/loader_diagram.png%
  }
  \caption{The Kubota R520s robotic 1-tonne-capacity wheel
    loader that was used for field experiments.}
  \label{fig:loader}
\end{figure}
```

Figures II

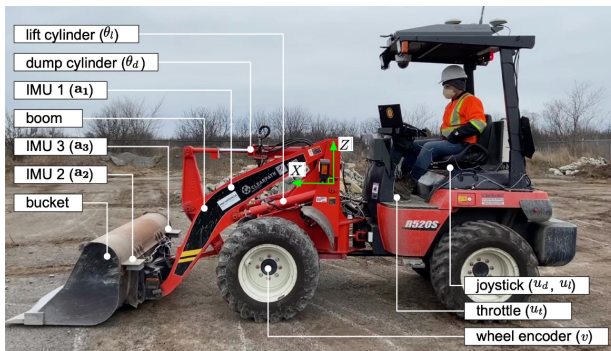


Figure 1: The Kubota R520s robotic 1-tonne-capacity wheel loader that was used for field experiments.


```
``\ldots the Kubota Loader in Figure~\ref{fig:loader}''
```

“...the Kubota Loader in Figure 1”

```
``see Equation~\ref{eq:CWTint}''
```

“see Equation 1”

Markup language for defining bibliography entries

```
@inproceedings{artan2021,  
  author    = {Artan, Unal and Fernando, Heshan and Marshall, Joshua A.},  
  booktitle = {2021 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)},  
  title     = {Automatic Material Classification via Proprioceptive Sensing and Wavelet Analysis During  
    ↪ Excavation},  
  year      = {2021},  
  pages     = {612–617},  
  doi       = {10.1109/AIM46487.2021.9517696}  
}
```

```\ldots due to breakthrough research \cite{artan2021}''`

“...due to breakthrough research [1]”

# Listing bibliography references

```
\bibliographystyle{ieeetr}
\bibliography{references.bib}
```

- [1] U. Artan, H. Fernando, and J. A. Marshall, “Automatic material classification via proprioceptive sensing and wavelet analysis during excavation,” in *2021 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, pp. 612–617, 2021.

```
\renewcommand{cmd}[args][default]{def}
```

```
\renewenvironment{nam}[args][default]{begdef}{enddef}
```