Introduction to LATEX

A high-quality document preparation system

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Department of Mechanical Engineering
Benha Faculty of Engineering
Benha University

Writing Technical Report, Manuscript and Thesis

AGENDA

- **Latex Introduction.**
- **Latex Installation.**
- **Using main structures and templates.**
- **Working Other Editors.**
- **Collaborative writing using latex.**

Latex Introduction

What is LaTeX?

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- **Solving mathematical equations.**

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- **Plotting figures for different data.**

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- **Plotting figures for different data.**

The main coins of latex is that its need time and efforts to learning

Latex Introduction

Source.tex

```
\documentclass[twocolumn]{article}

\begin{document}
\title{Resource Allocation and Computation Offloading with Data Security for Mobile Edge Computing}

\author{Ibrahim A. Elgendy}

\begin{abstract}
\textbf{Write} the abstract here Write the abstract here Write the abstract here Write the abstract here Write the abstract here Write the abstract here Write the abstract here Write the abstract here Write the abstract here.

\end{abstract}

\section{Introduction}\label{sec:introduction}
Write the \textit{introduction} here Write the introduction here Write the introduction here Write the introduction here Write the introduction here Write the introduction here Write the introduction here Write the introduction here Write the introduction here Write the introduction here Write the introduction here.

\section{Related Work} \label{relatedwork}
Write the related work here Write the related work here Write the related work here Write the related work here Write the related work here Write the related work here Write the related work here Write the related work here Write the related work here.

\section{System Model} \label{systemmodel}
Write the \underline{methodology} here Write the methodology here Write the methodology here Write the methodology here Write the methodology here Write the methodology here Write the methodology here Write the methodology here Write the methodology here.

\section{Conclusions} \label{conclusion}
Write the conclusion here Write the conclusion here Write the conclusion here Write the conclusion here Write the conclusion here Write the conclusion here Write the conclusion here Write the conclusion here Write the conclusion here.

\end{document}
```

Class.cls

```
\catcode`\@=12 \catcode`\@=12}
% combined action of \@IEEEnormalcatcodespunct and
\def\@IEEEnormalcatcodes{\@IEEEnormalcatcodespunct

% usage: \@IEEEextracttoken*{}
% \@IEEEextracttoken fully expands its argument (which it then stores in
% \@IEEEextracttokenarg) via \edef and then the meaning of the first
% nonbrace (but including the empty group) token found is assigned via \let
% to \@IEEEextractedtoken as well as stored in the macro
% \@IEEEextractedtokenmacro. Tokens that would otherwise be discarded during
% the acquisition of the first are stored in \@IEEEextractedtokensdiscarded,
% however their original relative brace nesting depths are not guereinteed to
% be preserved.
% If the argument is empty, or if a first nonbrace token does not exist (or
% is an empty group), \@IEEEextractedtoken will be \relax and
% \@IEEEextractedtokenmacro and \@IEEEextractedtokensdiscarded will be empty.
%
% For example:
% \@IEEEextracttoken{{{ab}{cd}}{{ef}g}}
% results in:
%
% \@IEEEextracttokenarg        ==> a macro containing {{ab}{cd}}{{ef}g}
% \@IEEEextractedtoken         ==> the letter a
% \@IEEEextractedtokenmacro    ==> a macro containing a
% \@IEEEextractedtokensdiscarded ==> a macro containing bcd{ef}g
%
% the *-star form, \@IEEEextracttoken*, does not expand its argument
% contents during processing.
\def\@IEEEextracttoken{\@ifstar{\let\@IEEEextracttokendef=\def\@@IEEEextracttoken}{\let\@IEEEextracttokendef=\edef\@@IEEEextracttoken}}

\def\@@IEEEextracttoken#1{\@IEEEextracttokendef\@IEEEextracttokenarg{#1}\relax
\def\@IEEEextractedtokensdiscarded{}\relax %% initialize to empty
% if the macro is unchanged after being acquired as a single undelimited argument
% with anything after it being stripped off as a delimited argument
% we know we have one token without any enclosing braces. loop until this is true.
\let\@IEEEextracttokencurgroup\@IEEEextracttokenarg
\loop
  % trap case of an empty argument as this would cause a problem with
  % \@@@IEEEextracttoken's first (nondelimited) argument acquisition
  \ifx\@IEEEextracttokencurgroup\@empty
    \def\@IEEEextractedtokenmacro{}\relax
  \else
    \expandafter\@@@IEEEextracttoken\@IEEEextracttokencurgroup\@IEEEgeneralsequenceDELIMETER\relax
  \fi
  \ifx\@IEEEextractedtokenmacro\@IEEEextracttokencurgroup
  \else
    \let\@IEEEextracttokencurgroup=\@IEEEextractedtokenmacro
\repeat
% we can safely do a \let= here because there should be at most one token
% the relax is needed to handle the case of no token found
\expandafter\let\expandafter\@IEEEextractedtoken\@IEEEextractedtokenmacro\relax}
```

Latex Introduction

Justification and hyphenation

Microsoft Word	LaTeX
Call me Ishmael. Some years ago – never mind how long precisely – having little or no money in my purse, and noth- ing particular to interest me on shore, I thought I would sail about a little and see the wa- tery part of the world. It is a way I have of driving off the spleen, and regulating the cir- culation. Whenever I find my- self growing grim about the	Call me Ishmael. Some years ago – never mind how long precisely – having little or no money in my purse, and noth- ing particular to interest me on shore, I thought I would sail about a little and see the watery part of the world. It is a way I have of driving off the spleen, and regulating the circulation. Whenever I find myself growing grim about the

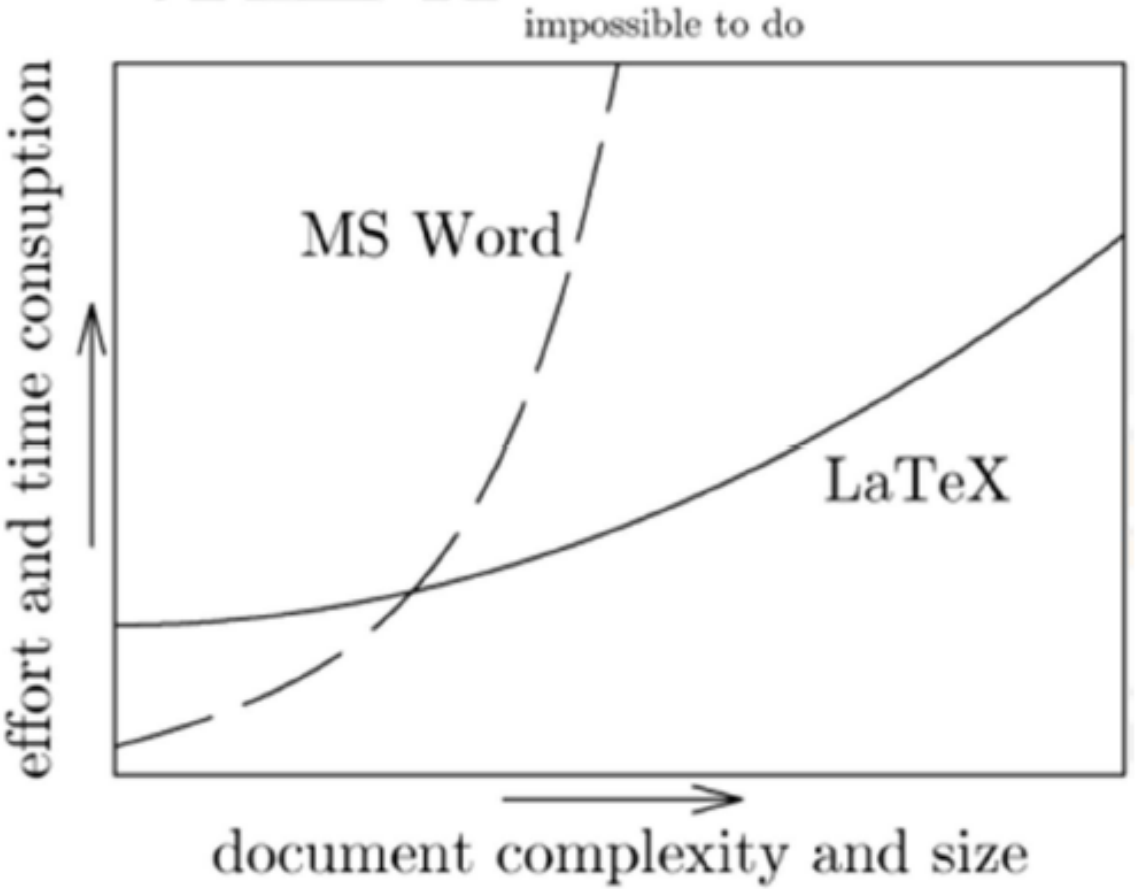
Ligatures

Microsoft Word	grafiet efficiënt fles souffleur fjord
LaTeX	grafiet efficiënt fles souffleur fjord

Kerning

Microsoft Word	Tafel	AVA	*AVA*
LaTeX	Tafel	AVA	*AVA*

Word and Latex Comp.



LaTeX or MS Word

Use it if:

- You type a lot of equation
- You like plain text, stable formats

Don't use it if:

- Write simple and small documents.
- You want to control every graphical aspect of whole document.(custom layout)
- You need to exchange documents with non-LaTeX people.

Latex Tools

- **Distributions.**
- **Editors.**

Latex Distributions

- MiKTeX
- TeXLive

Latex Editors

- TeXstudio
- TeXmaker
- TeXworks
- TeXmacs
- WinEdt
- Scientific WorkPlace
- LyX
- Overleaf

How to Install TeXLive

1. **Go to this page:**
   https://mirrors.ircam.fr/pub/CTAN/systems/texlive/Images/ **and download the file *texlive2019.iso***

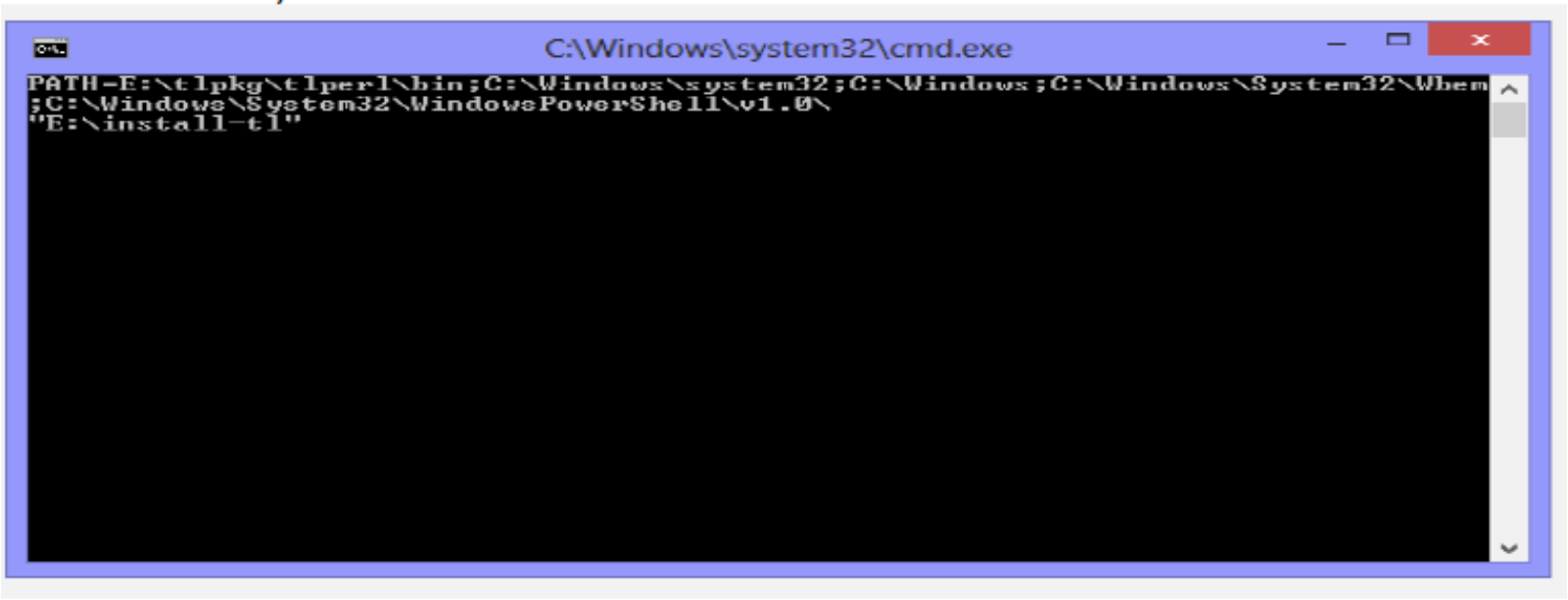
Index of /pub/CTAN/systems/texlive/Images

Name	Last modified	Size	Description
Parent Directory		-	
README.md	2019-04-29 22:28	1.1K	
texlive.iso	2019-04-10 17:59	3.3G	
texlive2019-20190410.iso	2019-04-10 17:59	3.3G	
texlive2019-20190410.iso.md5	2019-04-10 17:59	59	
texlive2019-20190410.iso.sha512	2019-04-10 17:59	155	
texlive2019-20190410.iso.sha512.asc	2019-04-10 17:59	455	
texlive2019.iso	2019-04-10 17:59	3.3G	
texlive2019.iso.md5	2019-04-10 17:59	50	
texlive2019.iso.sha512	2019-04-10 17:59	146	
texlive2019.iso.sha512.asc	2019-04-10 17:59	455	

How to Install TeXLive

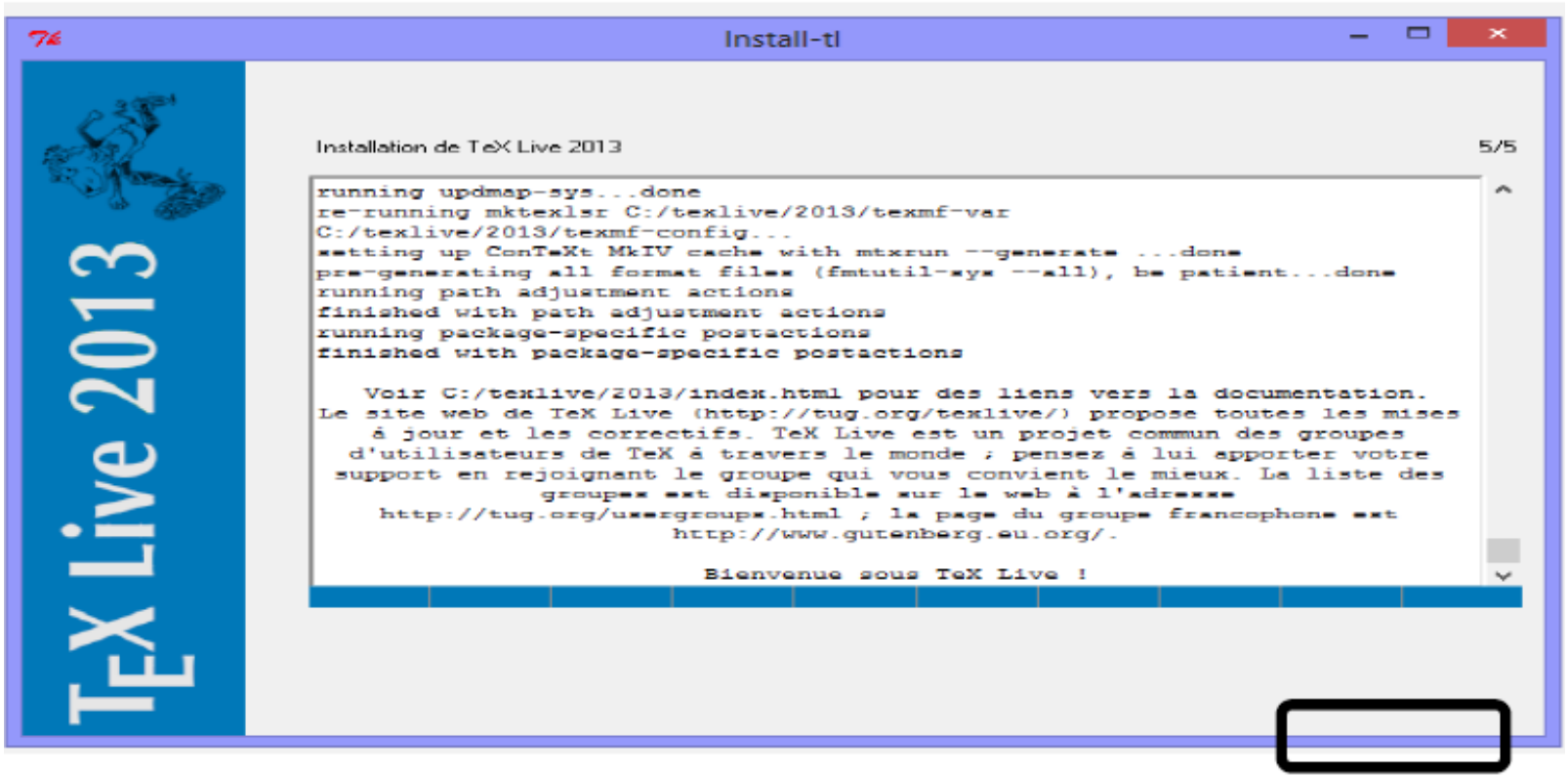
2. After downloading, mount the .iso image with any software (PowerISO, UltraISO)

3. Then, run *install-tl.bat* file.

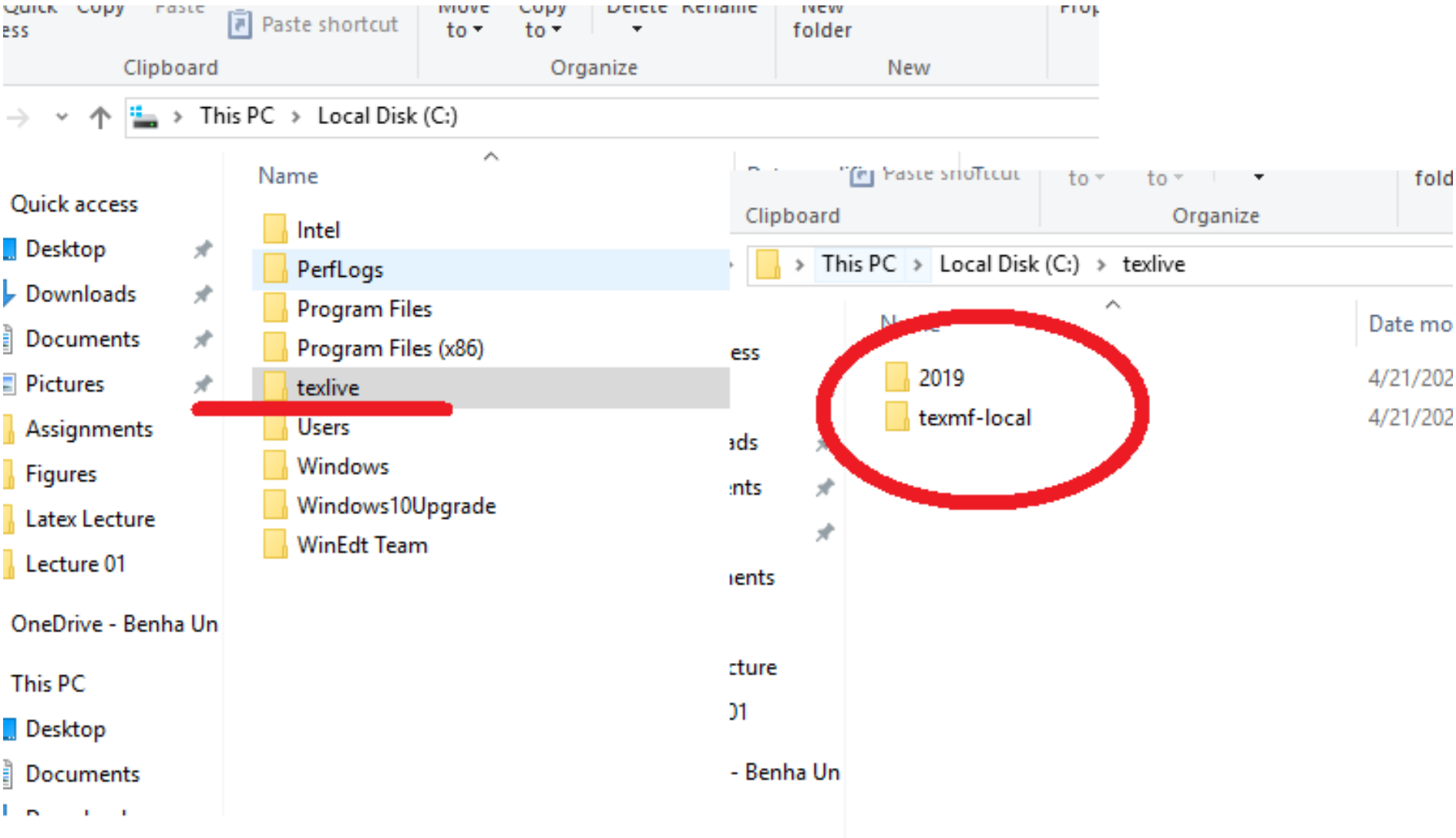


How to Install TeXLive

2. Then click ***Finish.***



Latex Installation

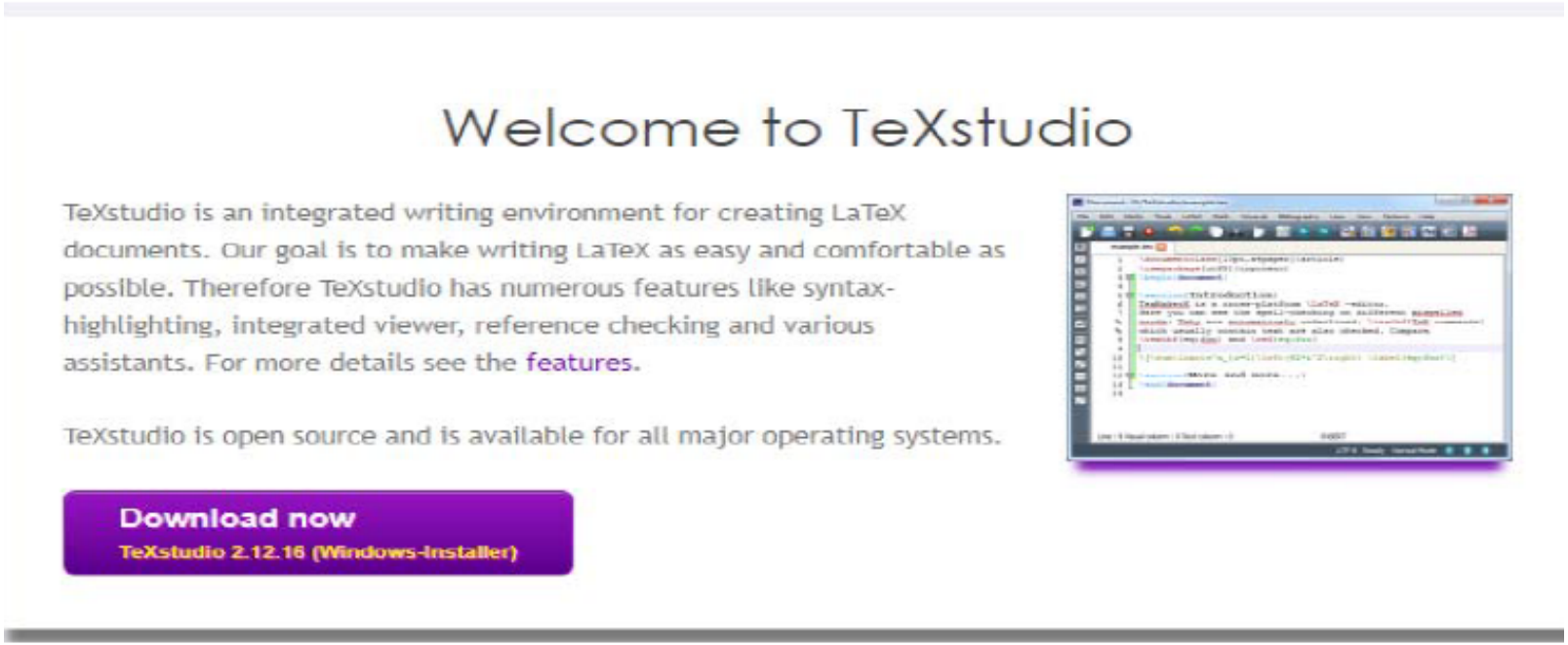


Latex Editors

- TeXstudio
- TeXworks
- WinEdt
- LyX
- TeXmaker
- TeXmacs
- Scientific Workplace
- Overleaf : Online Editing

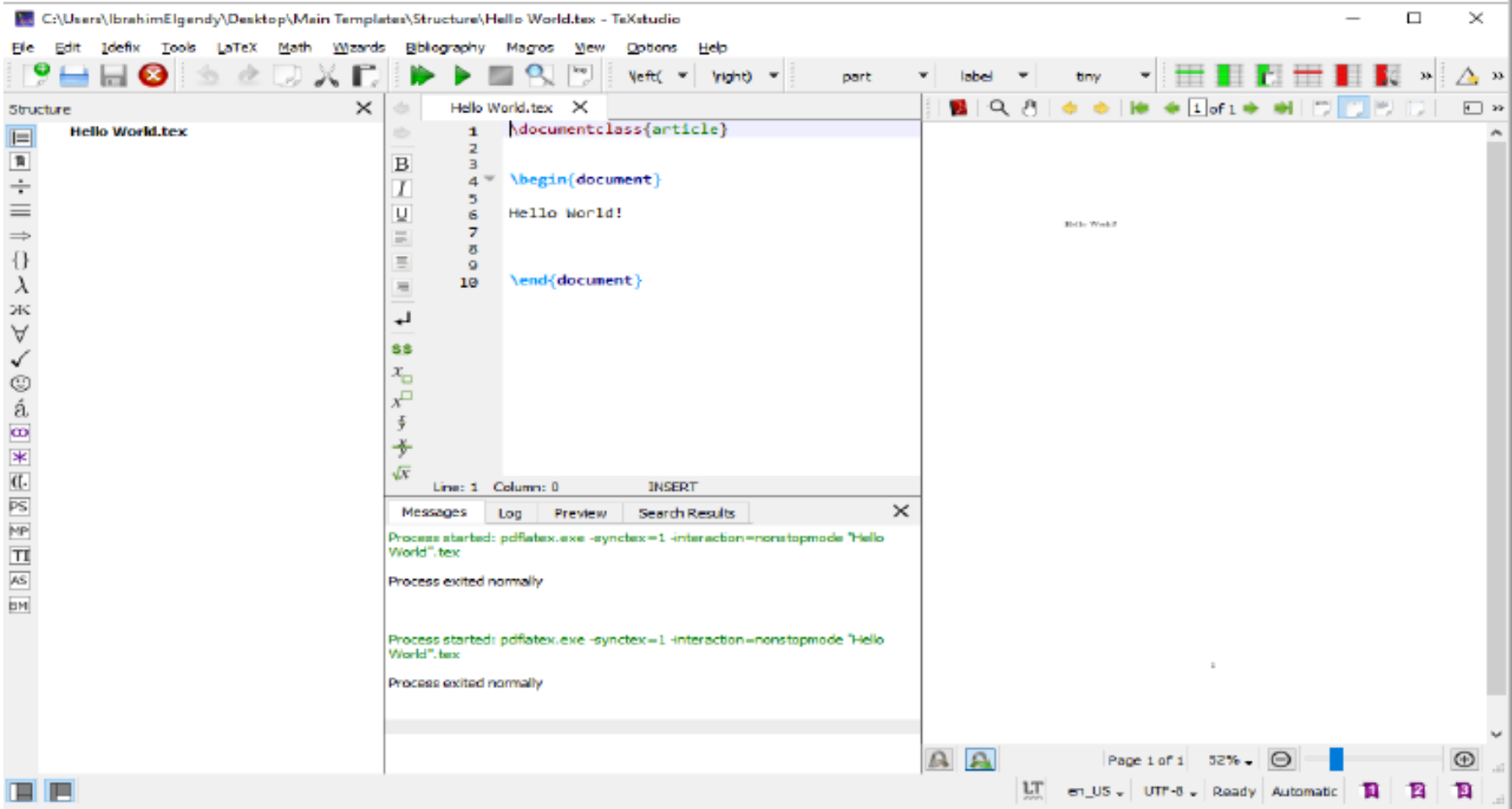
How to Install TeXStudio

1. **Go to this page: https://www.texstudio.org/ and download the latest version.**



Latex Installation

TexStudio Structure



Hello World Example

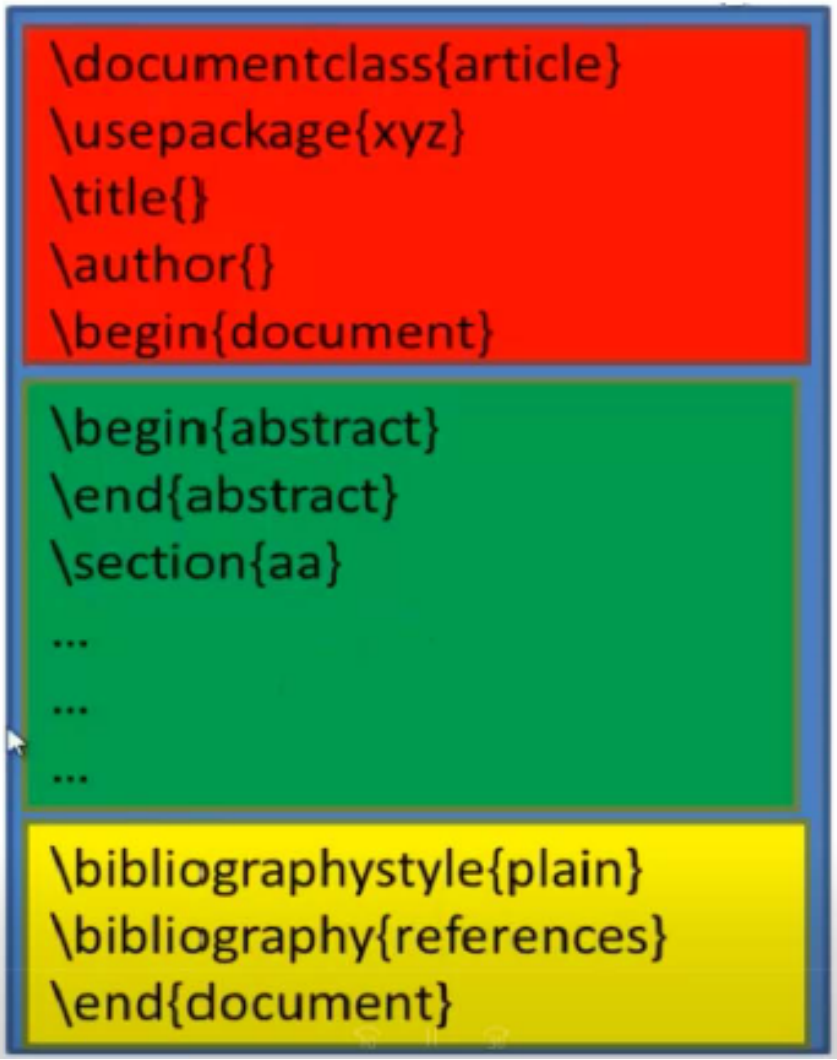
```
\documentclass{article}


\begin{document}

Hello World!



\end{document}
```

Output

Hello World!

Latex main structure

Source.tex



Preamble

Body

Bibliography

Latex main structure

File Structure

```
\documentclass{article}
\title{Main Title}

\begin{document}

\maketitle

\section{Introduction}
Write Introduction here.

\section{Related Works}
Write related works here.

\section{Methods}
Write your methodology here

\subsection{Methods 1}
Write more text here
\subsection{Methods 2}
Write more text here
\subsection{Methods 3}
Write more text here

\section{Results and Discussion}
Write results and discussion here.

\section{Conclusion}

Write the conclusion here.

\section{References}

Add your references in this part.

\end{document}
```

Output

Main Title

November 25, 2019

1 Introduction

Write Introduction here.

2 Related Works

Write related works here.

3 Methods

Write your methodology here

3.1 Methods 1

Write more text here

3.2 Methods 2

Write more text here

3.3 Methods 3

Write more text here

4 Results and Discussion

Write results and discussion here.

5 Conclusion

Write the conclusion here.

Latex main structure

Lists

```
\documentclass{article}

\begin{document}

\section{Unordered lists}

\begin{itemize}

      \item One
      \item Two
      \item Three

\end{itemize}

\section{Ordered lists}

\begin{enumerate}
      \item One
      \item Two
      \item Three
\end{enumerate}

\section{Nested lists}
\begin{enumerate}
      \item One
      \begin{enumerate}
            \item Two
            \item Three
            \item Four
      \end{enumerate}
      \item Five
      \item Six
\end{enumerate}

\end{document}
```

Output

1 Unordered lists

- One
- Two
- Three

2 Ordered lists

1. One
2. Two
3. Three

3 Nested lists

1. One
   (a) Two
   (b) Three
   (c) Four
2. Five
3. Six

Latex main structure

Figures

```
\documentclass{article}

\usepackage{graphicx}


\begin{document}

\begin{figure}
  \centering
  \includegraphics[width=0.5\textwidth, height=1.5in]{boat.png}
  \caption{Boat.}
  \label{boat_fig}
\end{figure}

Figure \ref{boat_fig} shows a boat.

\end{document}
```

Output

Figure 1: Boat.

Figure 1 shows a boat.

Tables

```
\documentclass{article}

\begin{document}

\begin{table}
        \centering
        \caption{Your first table.}
        \label{tab:table1}

        \begin{tabular}{l|c|r}
            \hline
            \textbf{Value 1} & \textbf{Value 2} &
            \textbf{Value 3}\\
            $\alpha$ & $\beta$ & $\gamma$ \\
            \hline
            1 & 1110.1 & a\\
            2 & 10.1 & b\\
            3 & 23.113231 & c\\
            4 & 25.113231 & d\\
            \hline
        \end{tabular}

\end{table}


\end{document}
```

Output

Table 1: Your first table.

Value 1 α	Value 2 β	Value 3 γ
1	1110.1	a
2	10.1	b
3	23.113231	c
4	25.113231	d

Equations

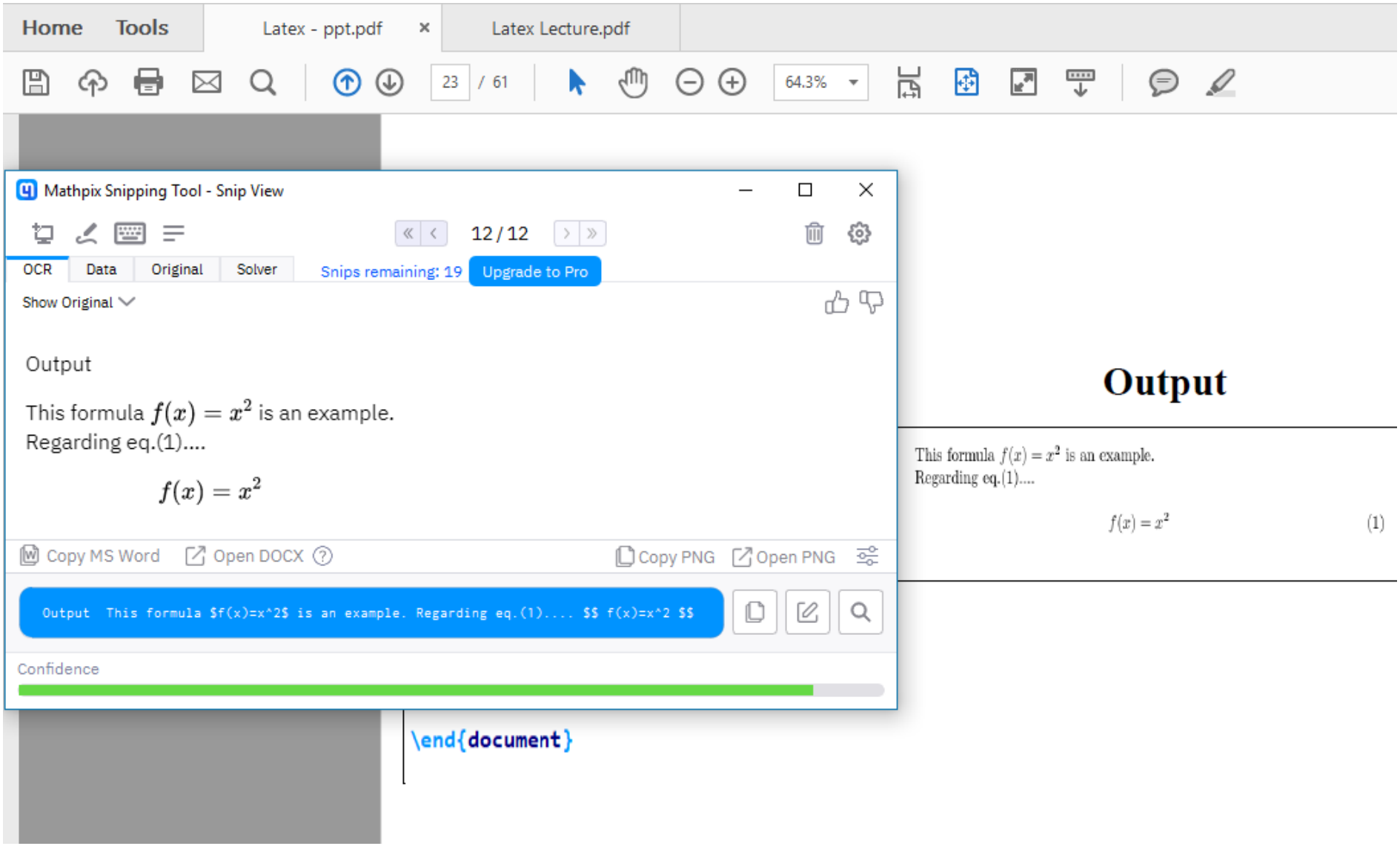
```
\documentclass{article}

\begin{document}

This formula $f(x) = x^2$ is an example.

Regarding eq.(\ref{squre_equ})....

\begin{equation}
\label{squre_equ}
  f(x) = x^2
\end{equation}

\end{document}
```

Output

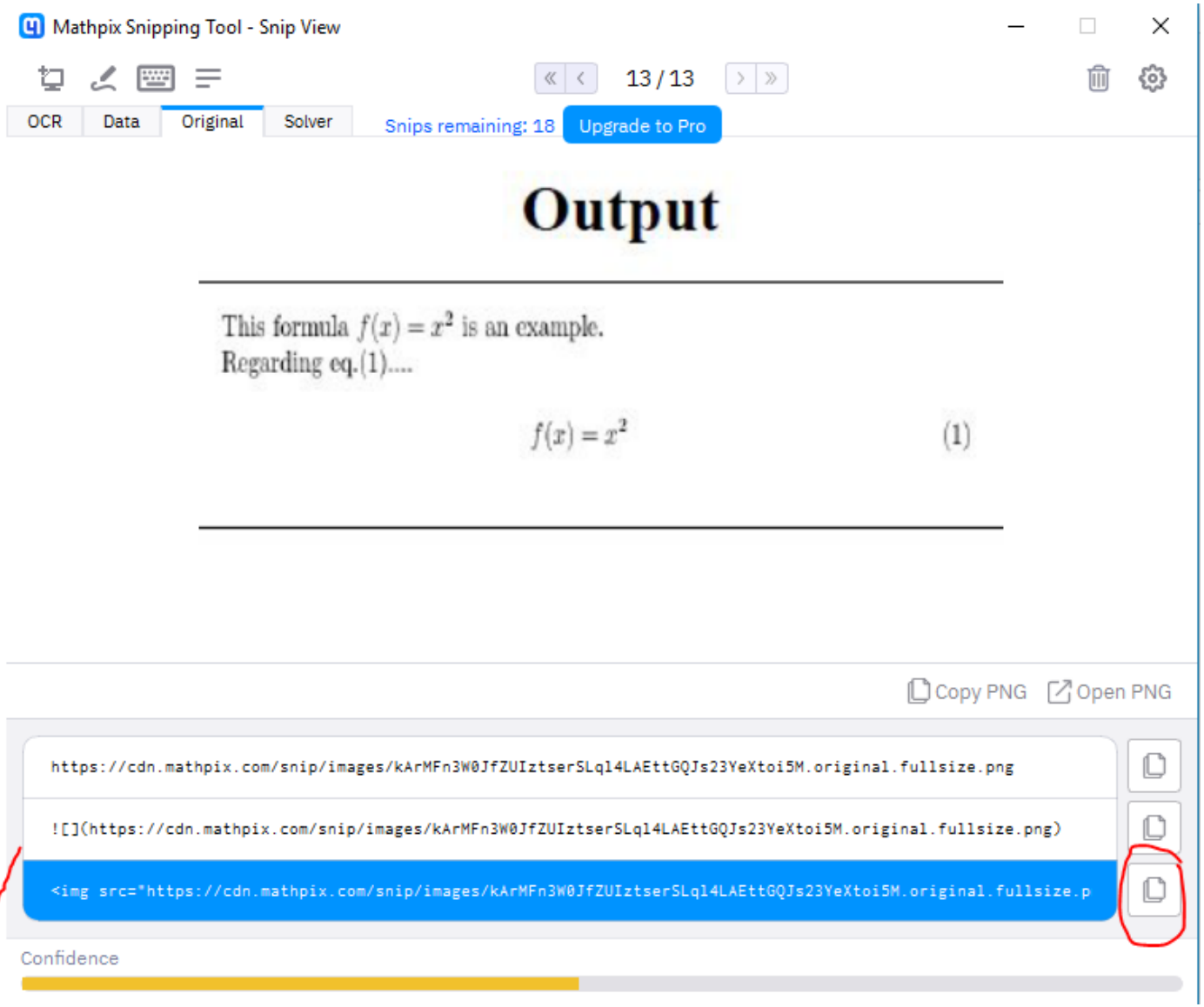
This formula $f(x) = x^2$ is an example.
Regarding eq.(1)....

$$f(x) = x^2 \tag{1}$$

Latex main structure



Latex main structure



References Using BibTex

1. References File (*.bib file*).
2. Reference Style.
3. Reference calling.

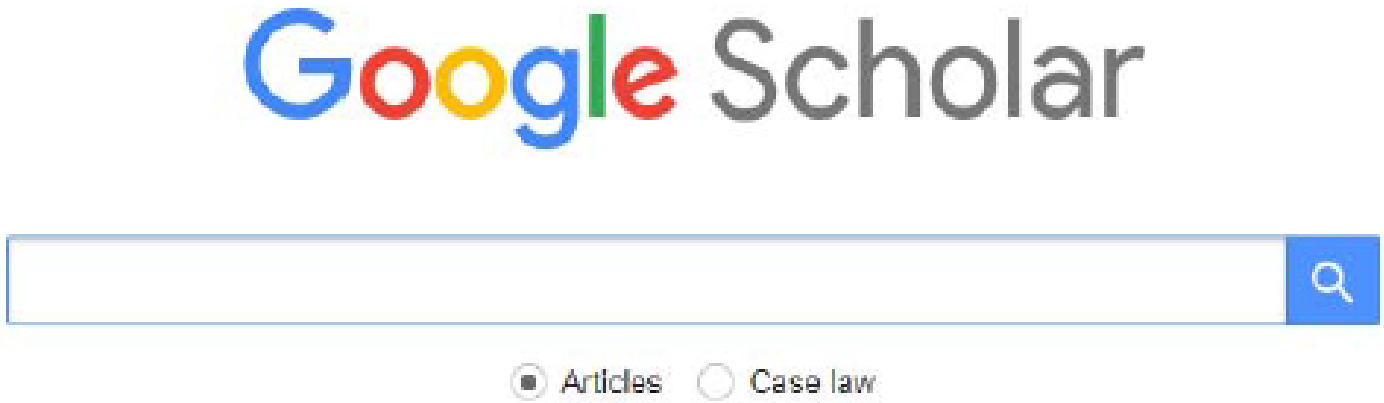
Latex main structure

References File (*.bib file*).

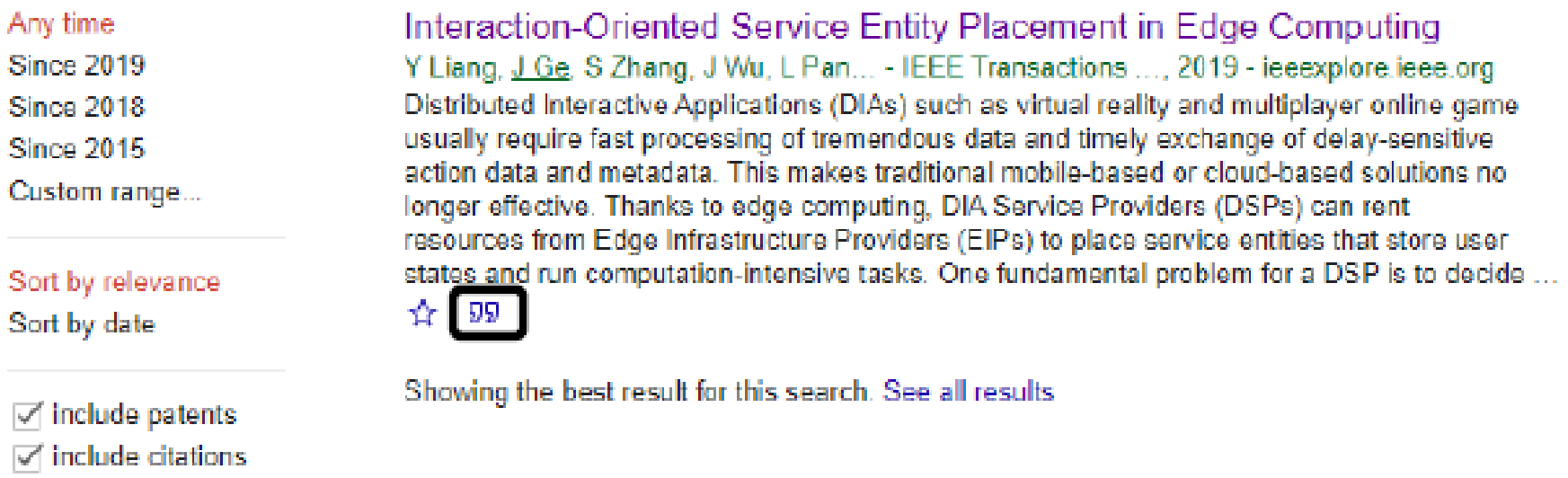
Citation Key

```
@Article{Booba2014Comparison,
  Title                    = {Comparison of ant colony optimization and particle swarm optimization in grid
  scheduling},
  Author                   = {Booba, B. and Gopal, T. V.},
  Journal                  = {Australian Journal of Basic \& Applied Sciences},
  Year                     = {2014},
  Number                   = {4},
  Pages                    = {230-235},
  Volume                   = {297}
}

@Book{burton2012android,
  Title                    = {Android Application Development For Dummies},
  Author                   = {Burton, Michael and Felker, Donn},
  Publisher                = {For Dummies},
  Year                     = {2012},
  Pages                    = {págs. 15-15}
}

@InProceedings{clonecloud2011,
  Title                    = {CloneCloud: elastic execution between mobile device and cloud},
  Author                   = {Chun, Byung Gon and Ihm, Sunghwan and Maniatis, Petros and Naik, Mayur and
  Patti, Ashwin},
  Booktitle                = {Conference on Computer Systems},
  Year                     = {2011},
  Pages                    = {301-314}
}
```

Generate BibTeX from Google Scholar

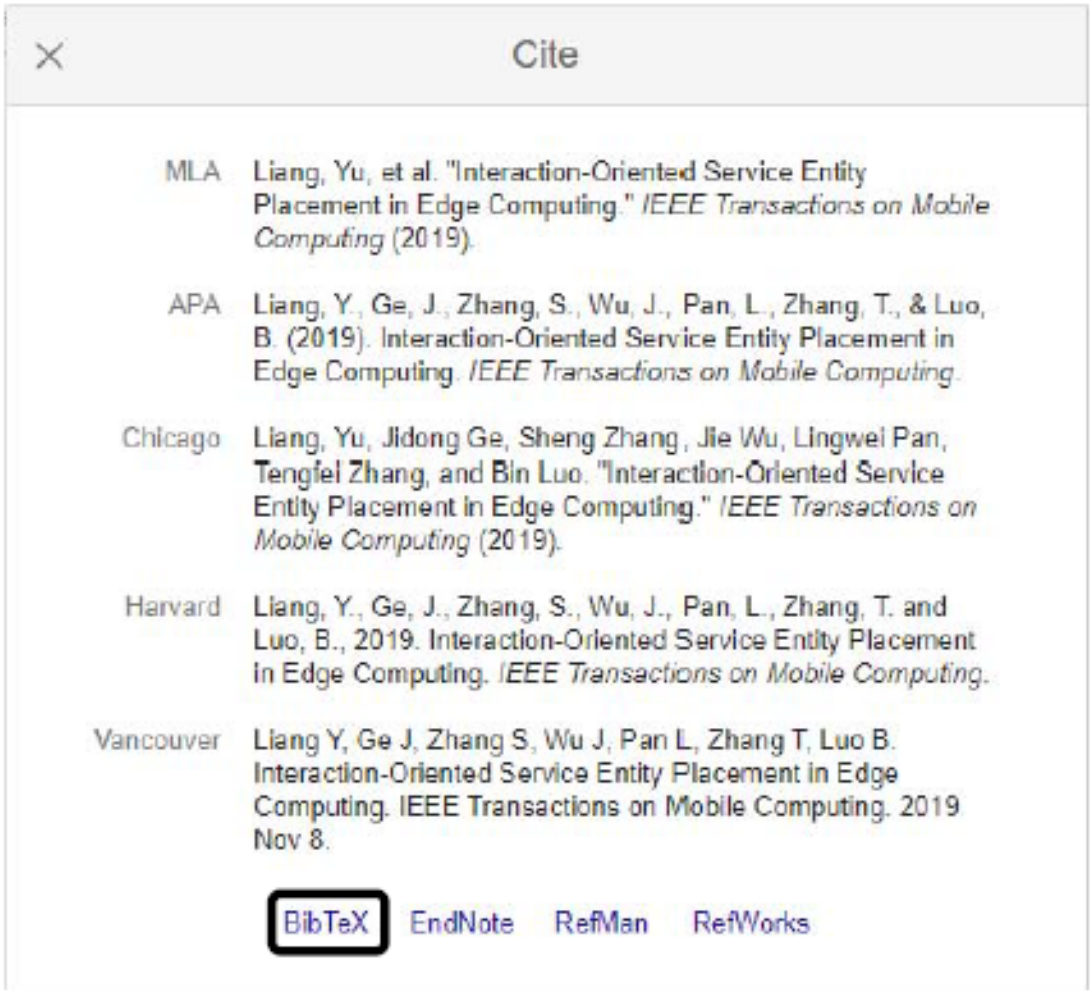


Generate BibTeX from Google Scholar



Latex main structure

Generate BibTeX from Google Scholar



Generate BibTeX from Google Scholar

```
@article{liang2019interaction,
  title={Interaction-Oriented Service Entity Placement in Edge Computing},
  author={Liang, Yu and Ge, Jidong and Zhang, Sheng and Wu, Jie and Pan, Lingwei and Zhang, Tengfei and Luo, Bin},
  journal={IEEE Transactions on Mobile Computing},
  year={2019},
  publisher={IEEE}
}
```

Reference calling.

```
\cite{CitationKey}
```

Latex main structure

Reference Style

plain, ieeetran, model1-num-names, …etc.

```
\bibliographystyle{Style}
\bibliography{ReferencesFile}
```

Bai, Qingshun, et al. "Development of dynamics for design procedure of novel grating tiling device with experimental validation." *Applied Sciences* 11.24 (2021): 11716. — MLA

Bai, Q., Shehata, M., Nada, A., & Shao, Z. (2021). Development of dynamics for design procedure of novel grating tiling device with experimental validation. *Applied Sciences*, *11*(24), 11716. — APA

BAI, Qingshun, et al. Development of dynamics for design procedure of novel grating tiling device with experimental validation. *Applied Sciences*, 2021, 11.24: 11716. — ISO 690

Working Other Editors

Using LATEX to wite Benha Faculty Of Engineering Reports.

Working Other Editors

Benha Faculty Of Engineering Report Template

[Write your title here, Write your title here, Write your title here, Write your title here, Write your title here]

By

1- Type your name here
2- Type your name here
3- Type your name here
4- Type your name here
5- Type your name here
6- Type your name here
7- Type your name here
8- Type your name here

Department of Mechanical Engineering
Benha Faculty of Engineering
Benha University
2024

Title page

[Write your title here, Write your title here, Write your title here, Write your title here, Write your title here]

By

1- Type your name here
2- Type your name here
3- Type your name here
4- Type your name here
5- Type your name here
6- Type your name here
7- Type your name here
8- Type your name here

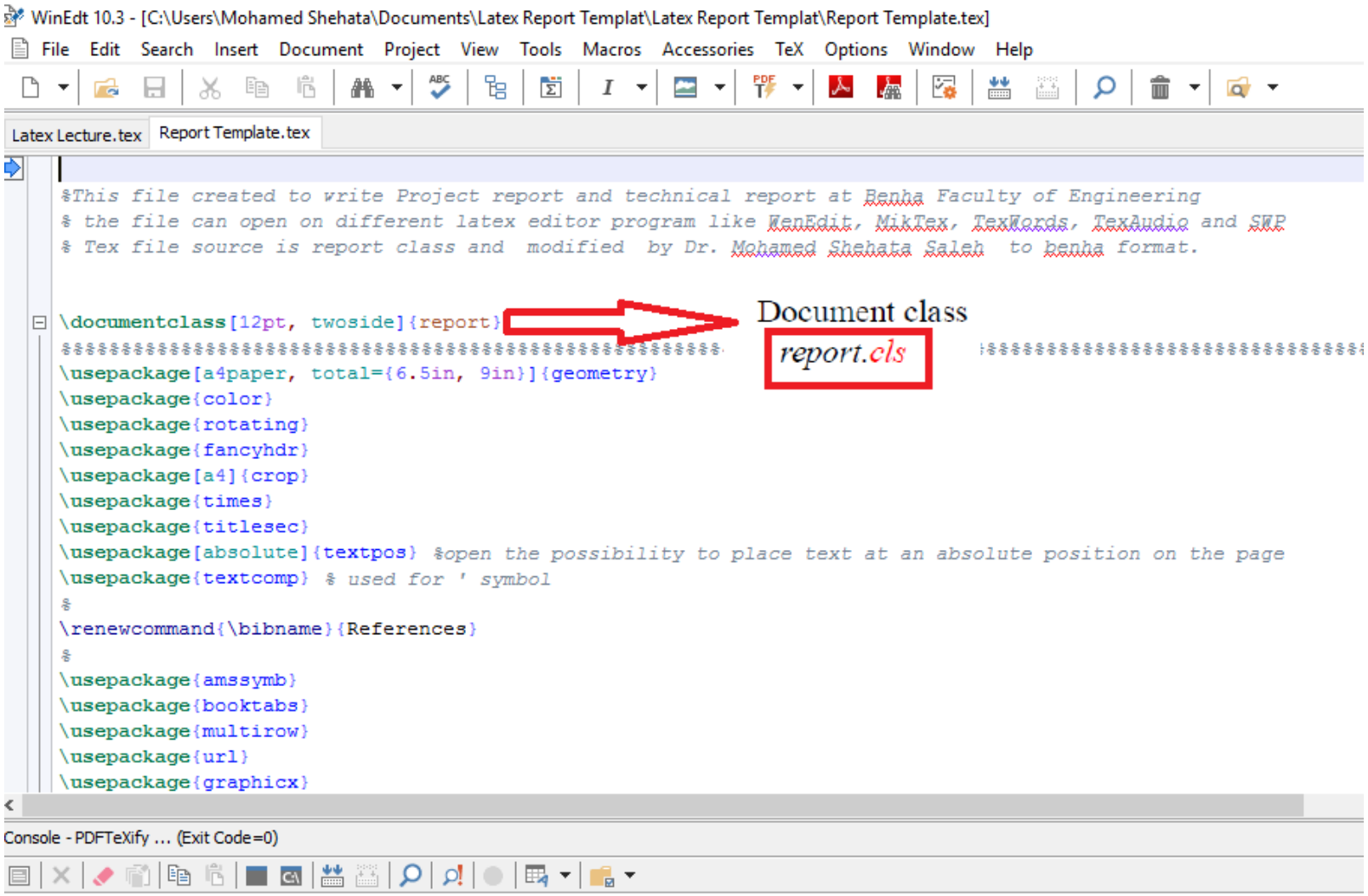
THIS REPORT IS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF BACHELOR OF MECHANICAL ENGINEERING

Supervisor:
Prof. /Dr. xxxxxxxxx

Department of Mechanical Engineering
Benha Faculty of Engineering
Benha University
2024

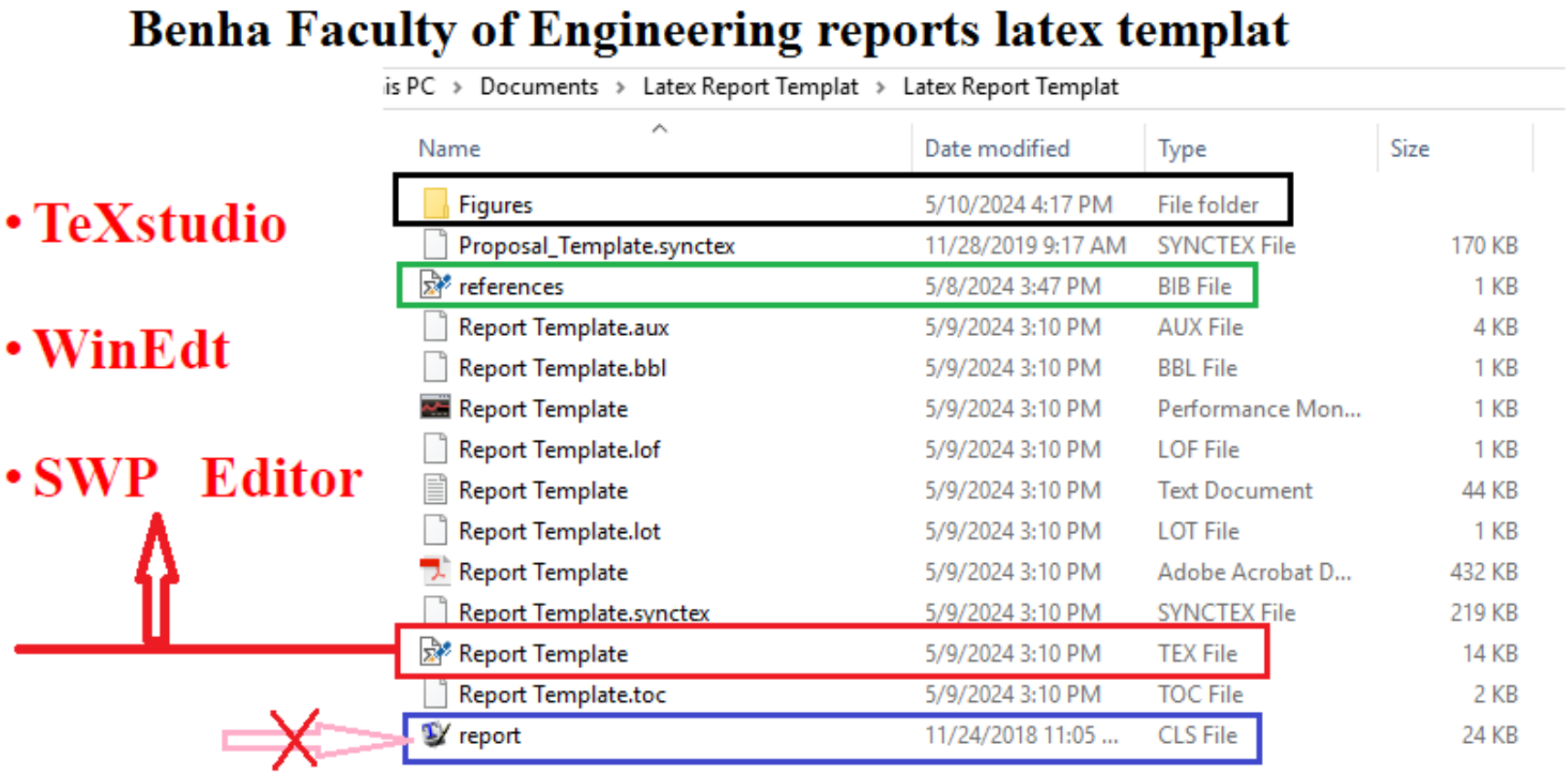
Working Other Editors

Benha Faculty Of Engineering Report Latex Template



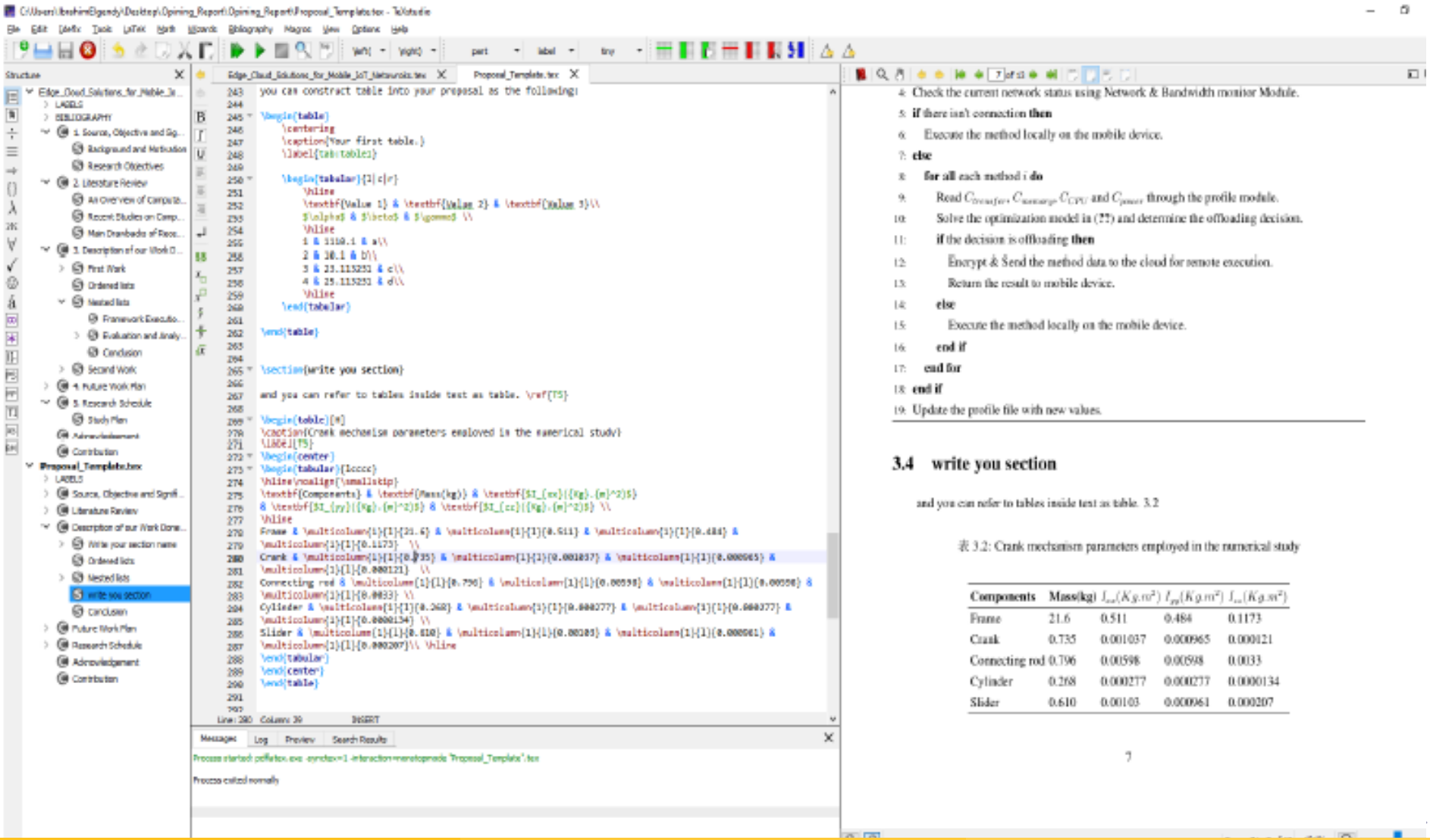
Working Other Editors

Report text file can be opened on different editor to fill your report.
Reference bib file is used to collect all references used in your report

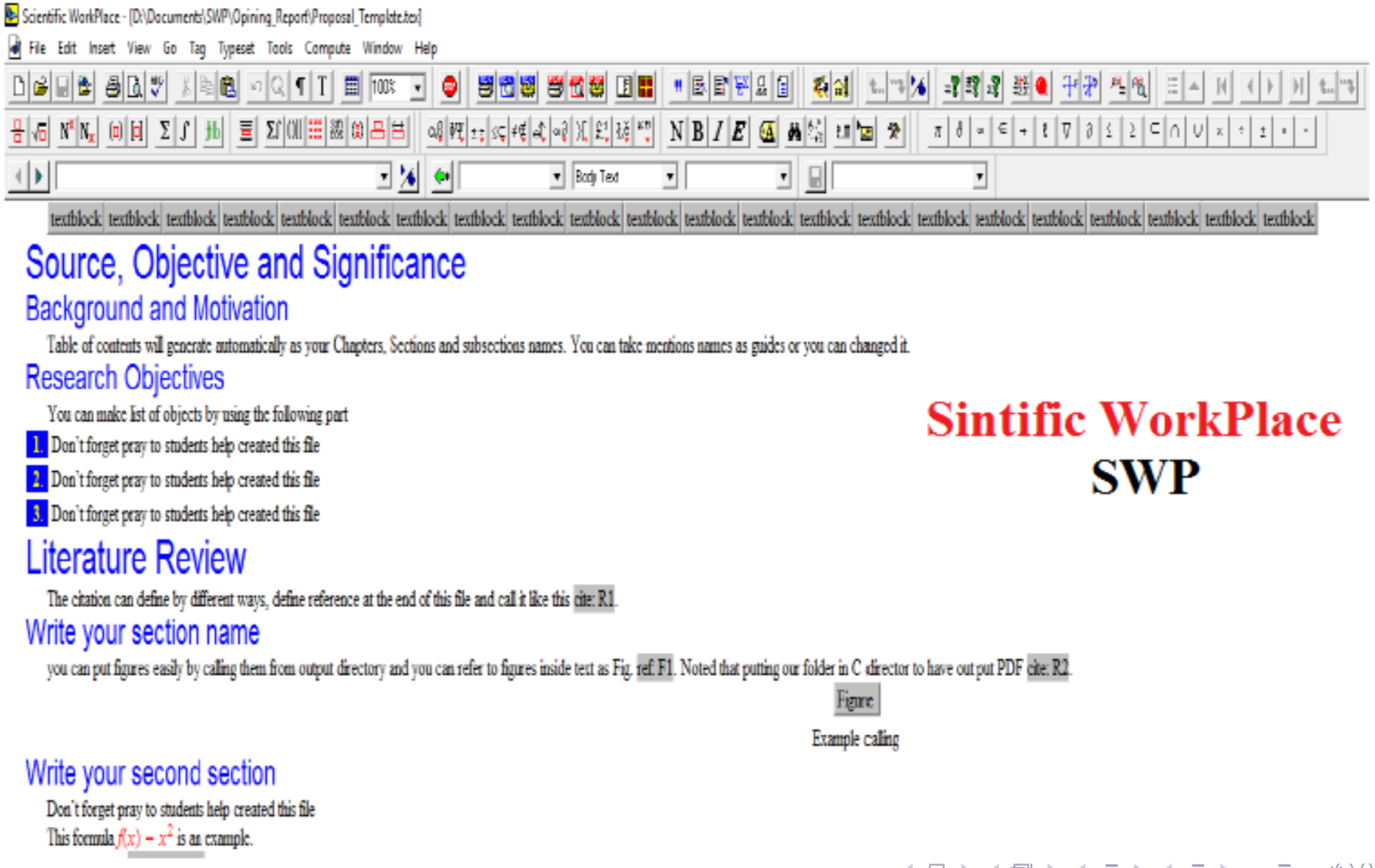


Working Other Editors

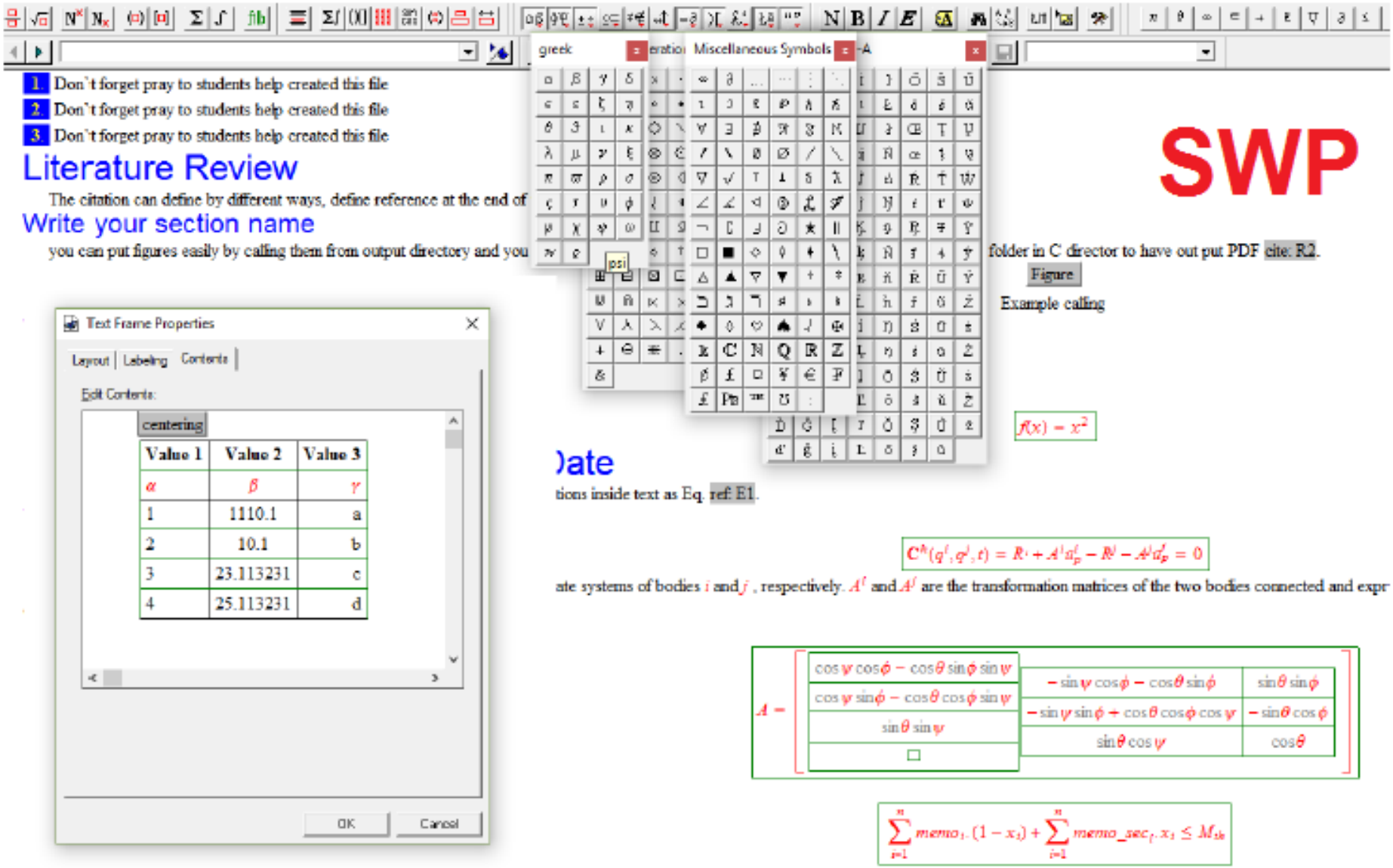
- **TeXstudio**



Working Other Editors

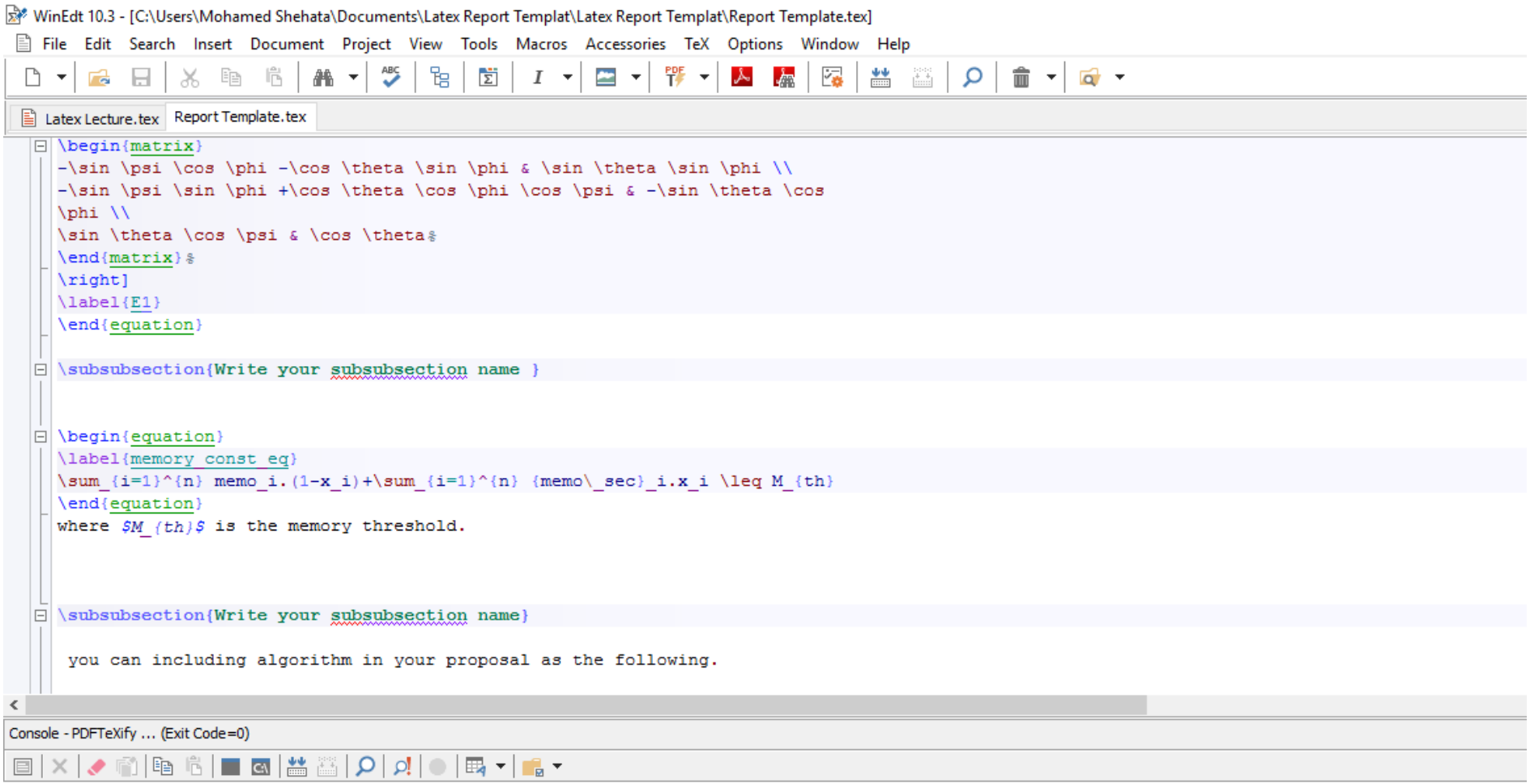


Working Other Editors

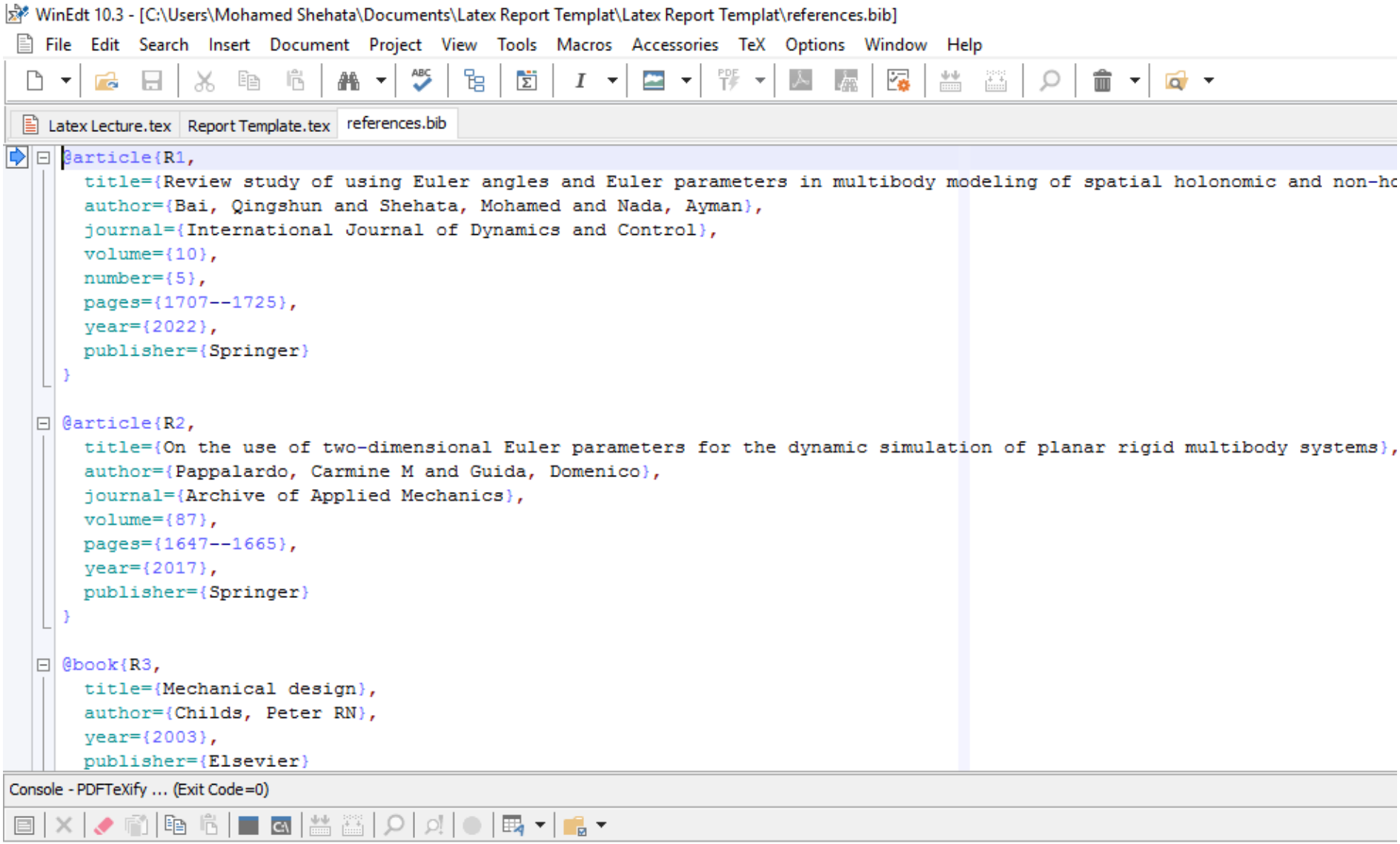


Working Other Editors

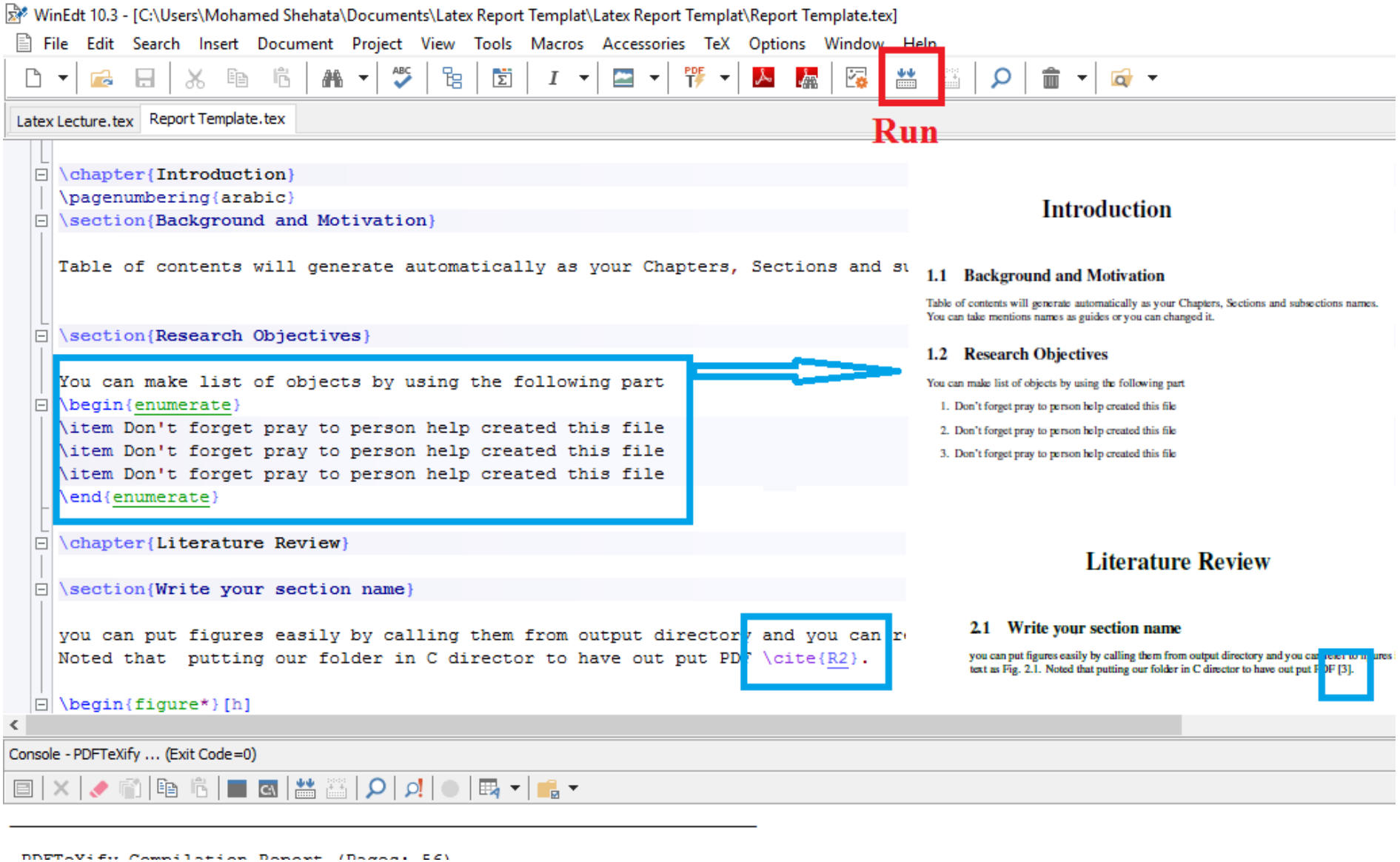
WinEdit



Working Other Editors



Working Other Editors



Working Other Editors

Contents

List of Figures

List of Tables

List of Symbols

x position
v velocity
a acceleration
t time
F force

Working Other Editors

Conclusion and future work

5.1 Study Plan

Notes:

- Feel free to use this template and ask if you have questions.
- your graduation year is 2024.

Figure 5.1: Mechatronics department Logo

5.2 Feel free to shear this file with other departments in our faculty [3]

References

[1] Qingshun Bai, Mohamed Shehata, and Ayman Nada. Review study of using euler angles and euler parameters in multibody modeling of spatial holonomic and non-holonomic systems. *International Journal of Dynamics and Control*, 10(5):1707–1725, 2022.

[2] Peter RN Childs. *Mechanical design*. Elsevier, 2003.

[3] Carmine M Pappalardo and Domenico Guida. On the use of two-dimensional euler parameters for the dynamic simulation of planar rigid multibody systems. *Archive of Applied Mechanics*, 87:1647–1665, 2017.

Using Journal, Conference and Thesis Latex Templates

Collaborative writing using latex

International Journal of Dynamics and Control
https://doi.org/10.1007/s40435-023-01377-1

Modeling and analysis of an RUU Delta Robot using SolidWorks and SimMechanics

Hoai Nam Le[1] · Nhu Thanh Vo[1]

Received: 31 July 2023 / Revised: 4 December 2023 / Accepted: 22 December 2023

Abstract
This paper illustrates the methodology for modeling, implementing, and controlling an RUU Delta Robot using computer-aided design and simulation software. Specifically, SolidWorks is employed to construct a CAD model with suitable properties, which is then exported to the MATLAB/SimMechanics environment for generating a multibody system block diagram. A PID controller is implemented to control the robot's position and trajectory movement. The study analyzes moment signal graphs at active joints, comparing them with existing research to validate the accuracy of the results. The investigation reveals that the influence of damping coefficients on the robotic dynamics is negligible, with simulation errors less than 0.02% for different end effect masses. Additionally, the study explores the impact of end effect mass on robotic dynamics and trajectory. Simulation results recommend an optimal operating range with an end effect mass of less than 3 kg, ensuring trajectory errors remain below 2%. As the end effect mass increases, a corresponding fluctuation in the robot's trajectory is observed, leading to longer times to reach the designed trajectory. This study provides valuable insights for practical applications, indicating that the proposed simulation approach is instrumental in assessing the performance of the robot controller before its deployment in an actual prototype.

Keywords SolidWorks · Simulation · MATLAB SimMechanics · RUU Delta Robot · CAD model · PID controller

1 Introduction

The RUU-type Delta Robot, pioneered by Professor Reymond Clavel's team in the early 1980s [1], is a successful

then exported to the MATLAB/SimMechanics environment for control implementation. Previous studies by Sen, et.al, [5] and Ibrahim [6], and Olaya [7] have tackled similar issues but focused on Scara and mobile robots and controlled only the

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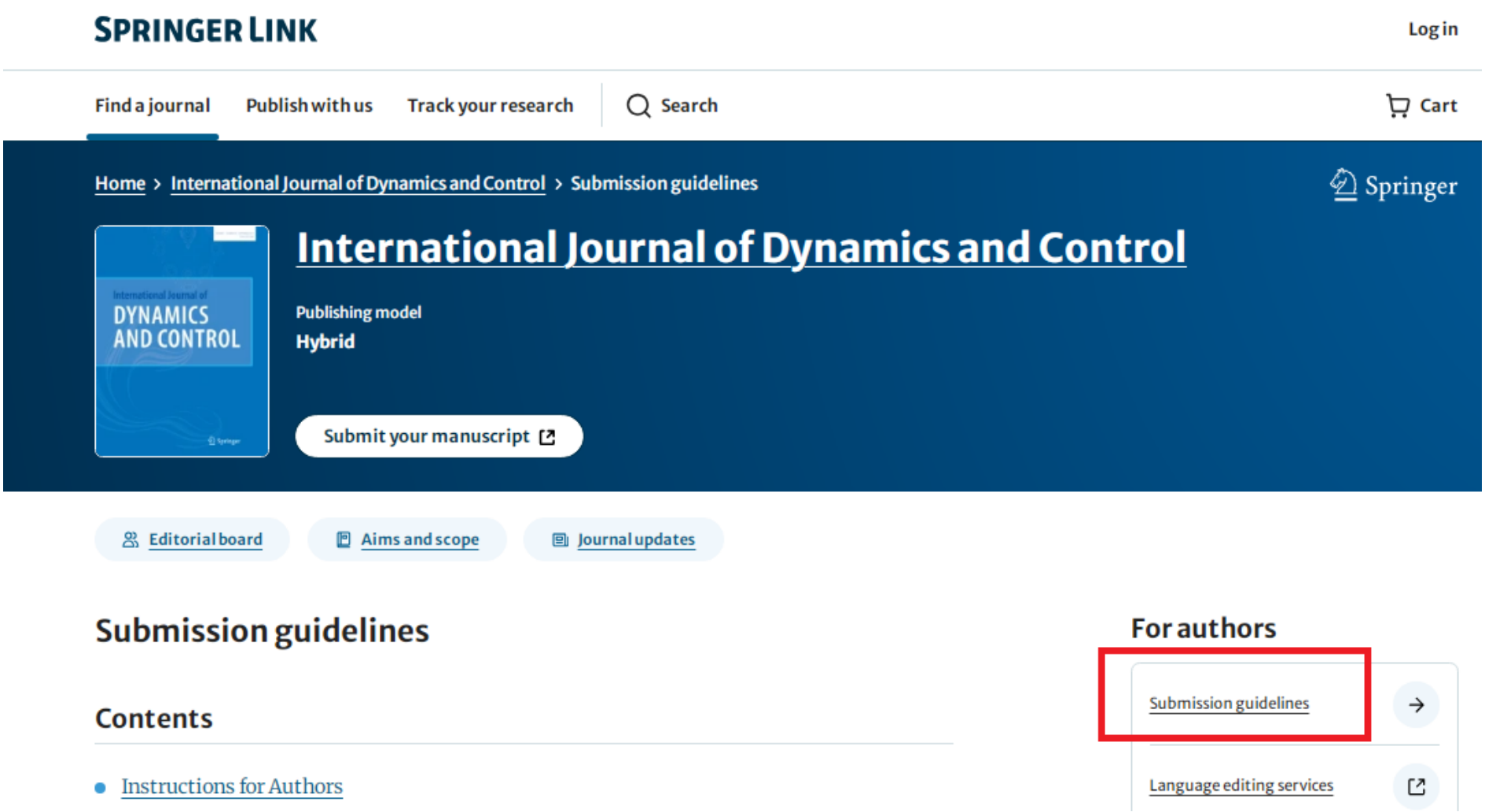

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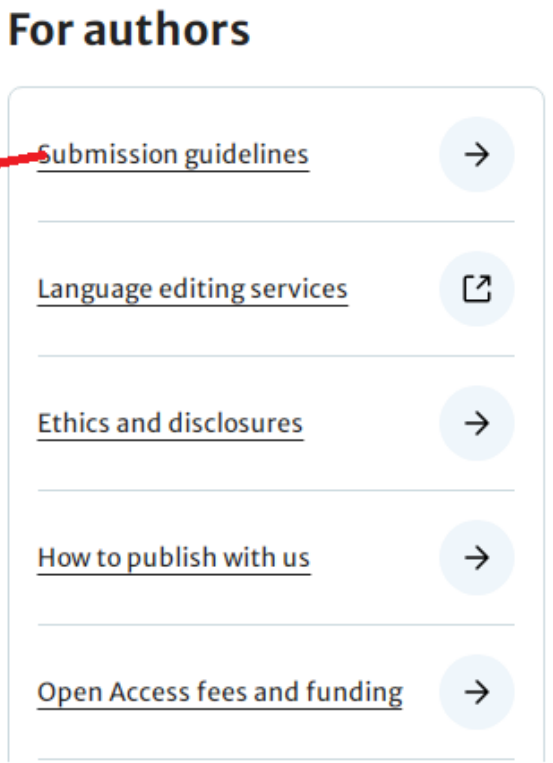

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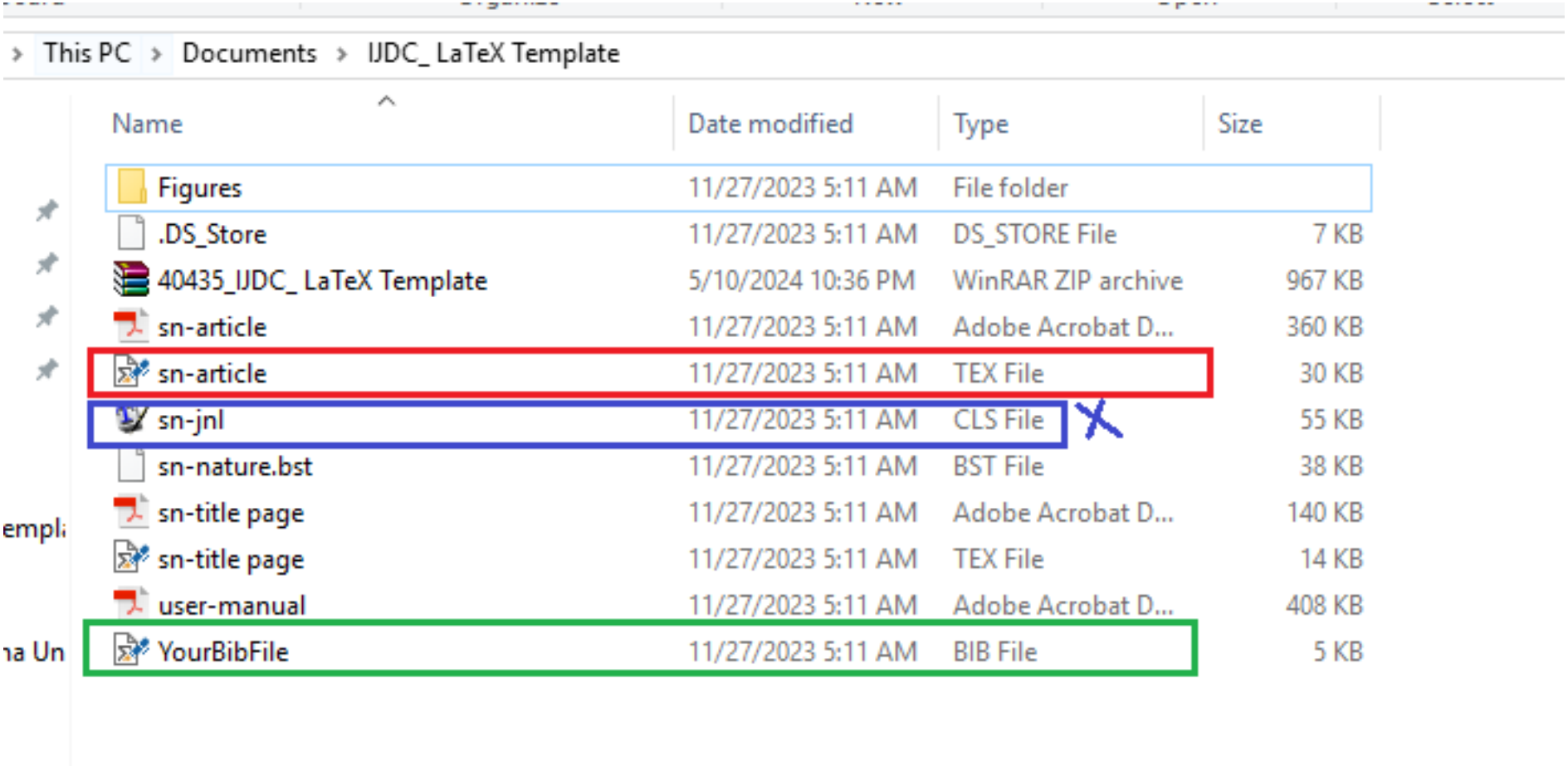

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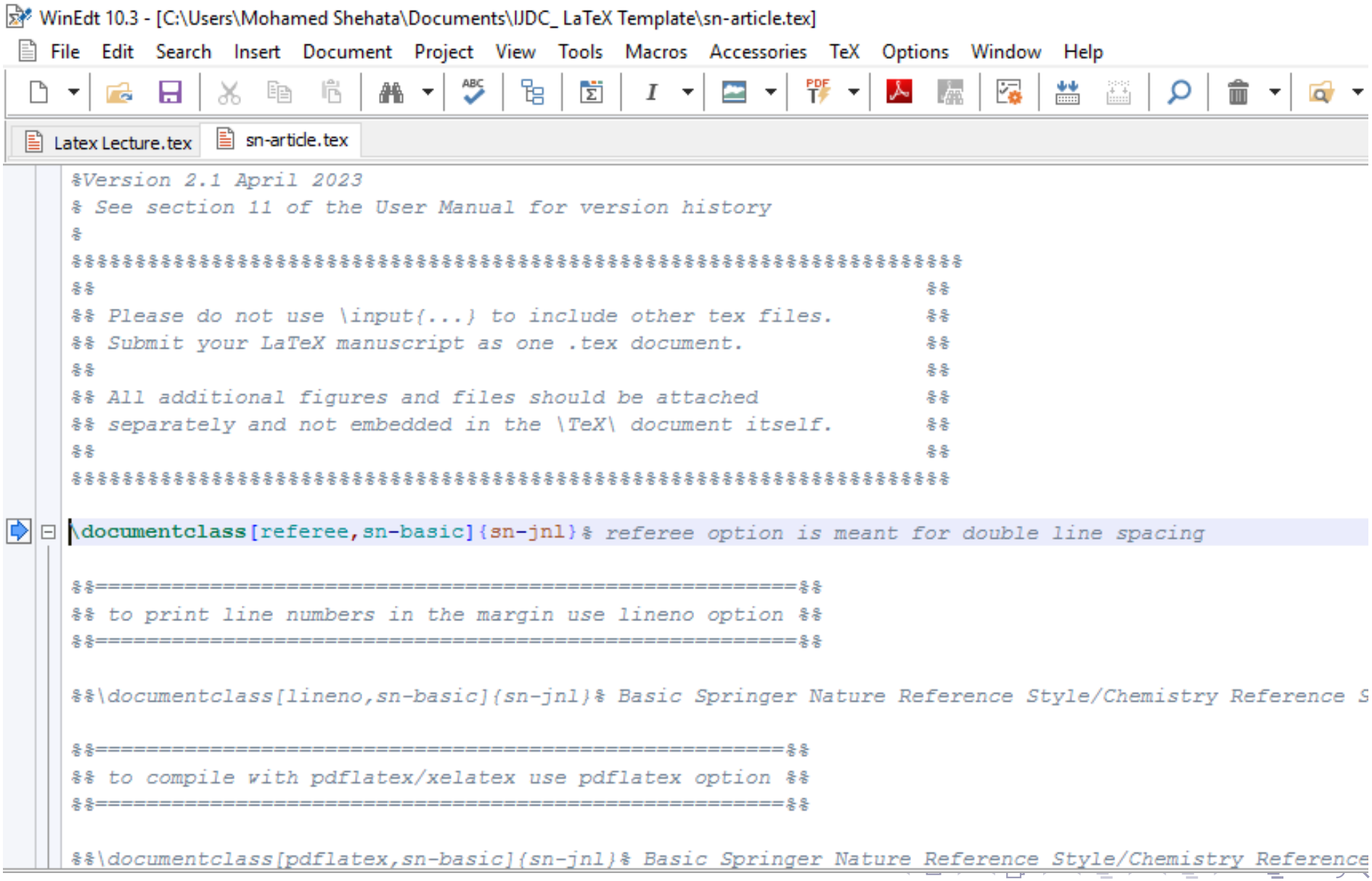

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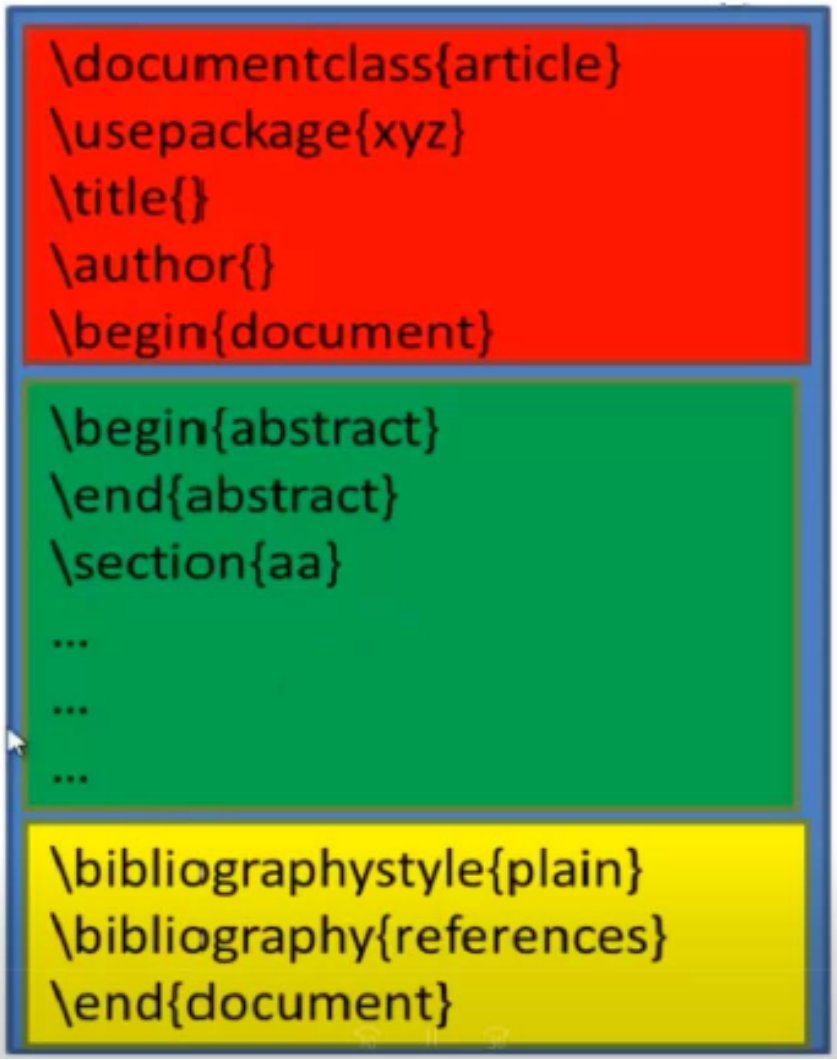

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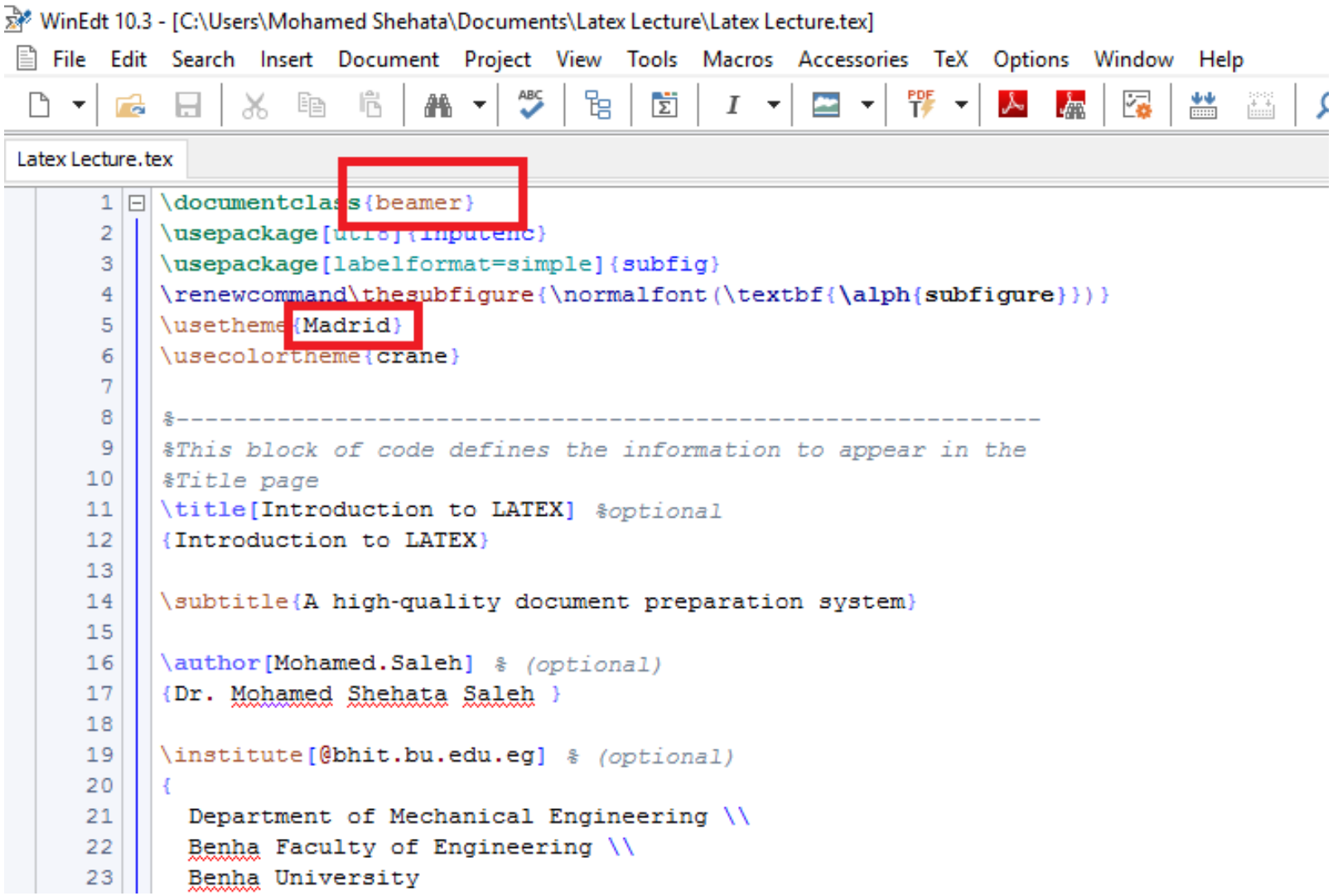

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Lecture Notes on Robotics

Course Code (M1596)

Dr. Mohamed Shehata Saleh

Department of Mechanical Engineering
Benha Faculty of Engineering
Benha University

Lecture 01: Introduction to Robotics Course

February 13, 2024

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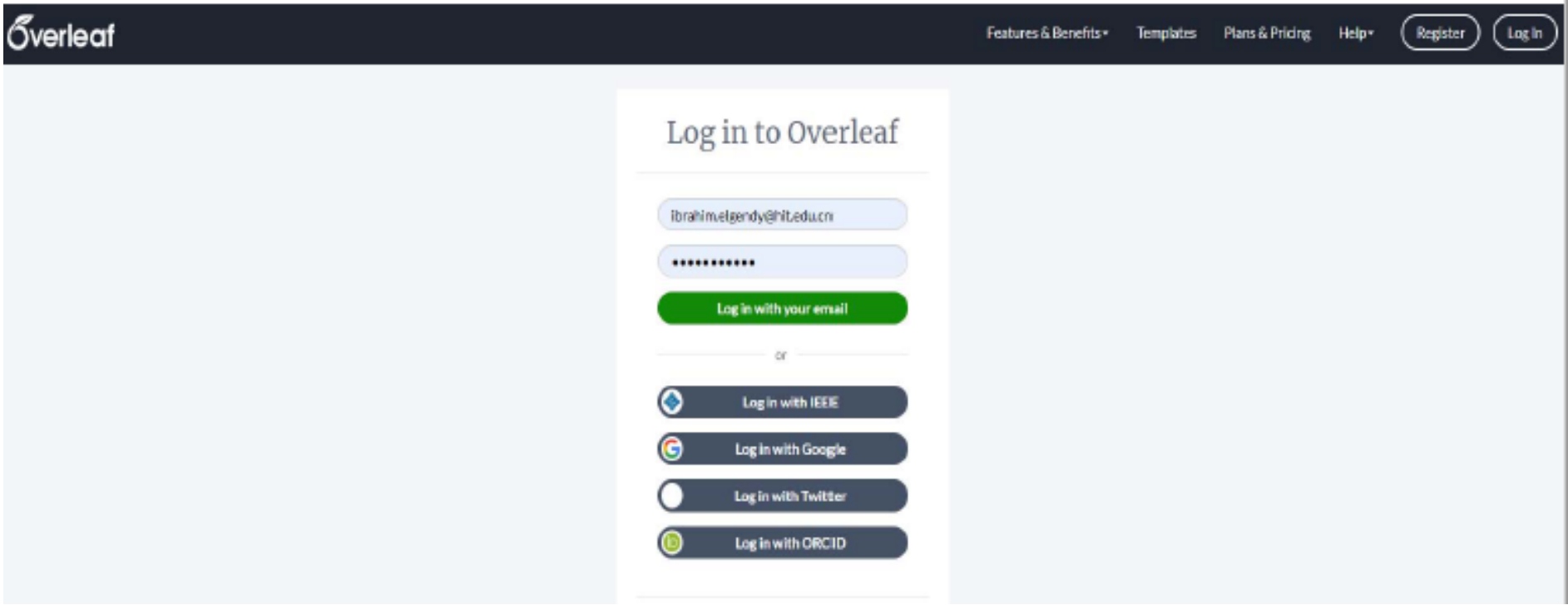

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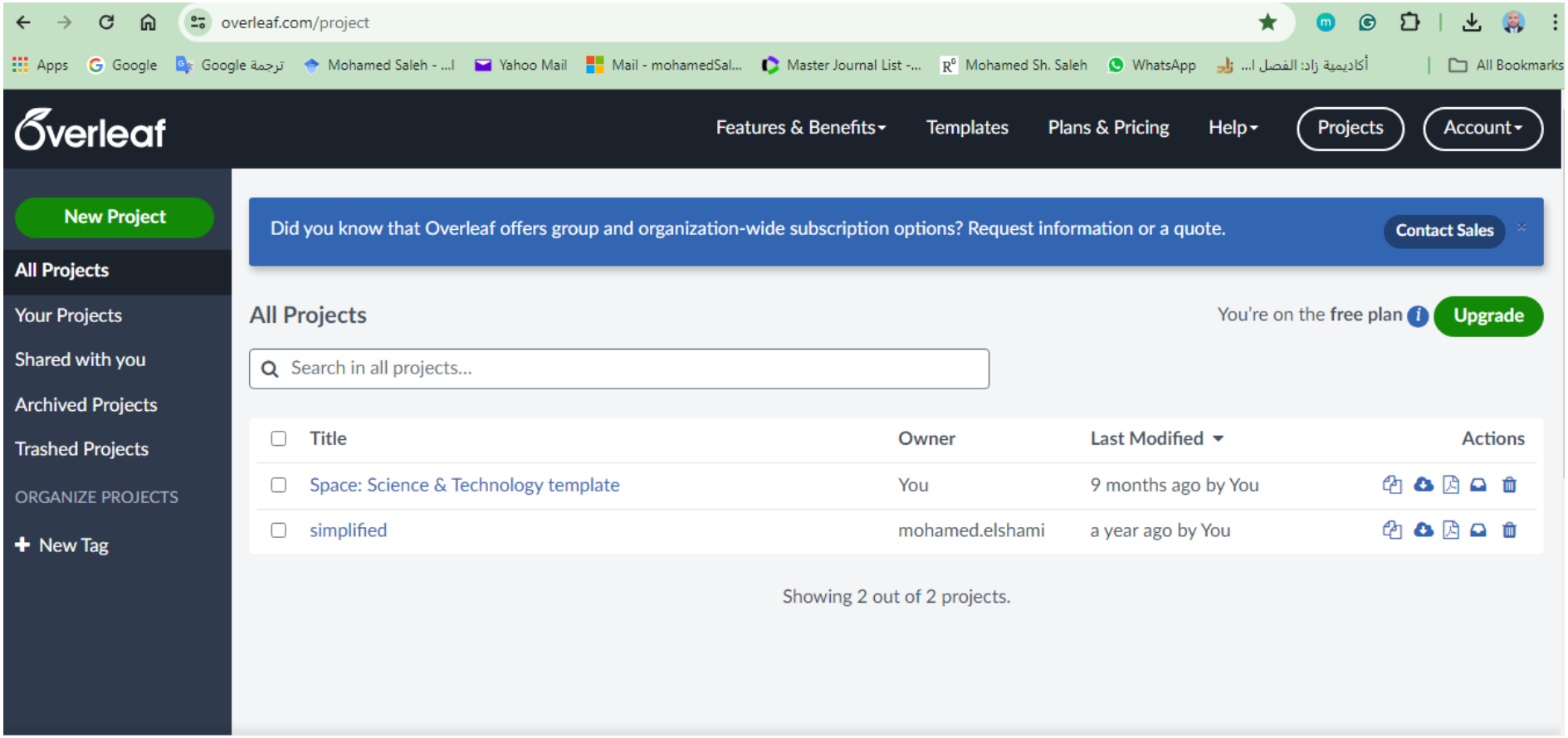

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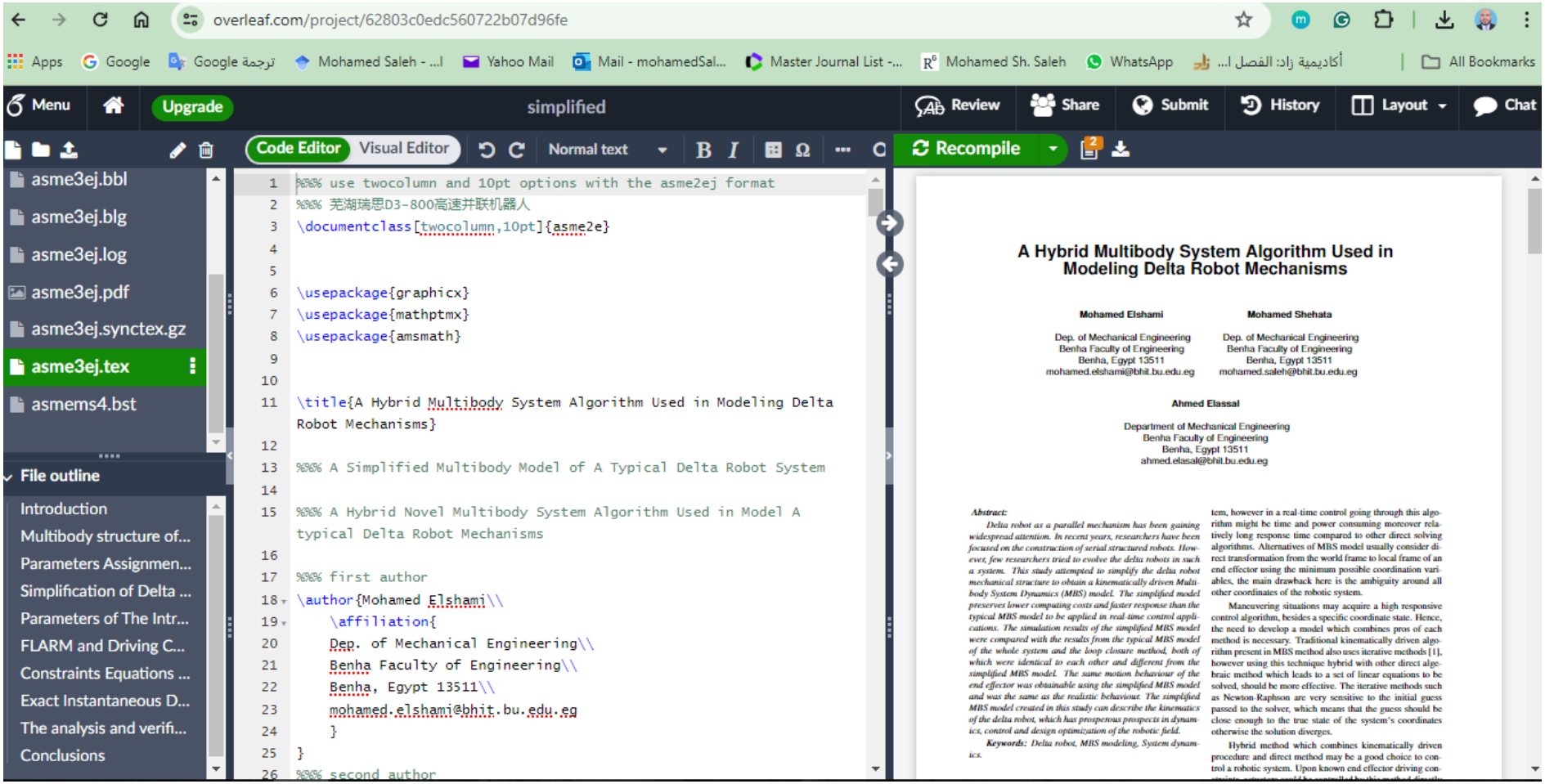

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1. English Videos

- https://www.youtube.com/watch?v=SoDv0qhyysQ&list=PL1D4EAB31D3EBC449&index=2&t=0s
- https://www.youtube.com/watch?v=G-bND5CHbIk&list=PLkJyhB6OrfPkVBq5DYy2-maBCIOlKPIYY&index=2&t=0s
- https://en.wikibooks.org/wiki/LaTeX

2. Arabic Videos:

- https://www.youtube.com/watch?v=S6wUTuSx3N8&list=PL_rxK_FJ4p0agYcYRZwa9mbMUvnhesZ4v

3. Books:

- LaTeX Beginner's Guide by Stefan Kottwitz.
- Guide to LaTeX (4th Edition) 4th Edition by Helmut Kopka and Patrick W. Daly.

Books can be downloaded from this site:

- **http://gen.lib.rus.ec/**

Lecture End

Thank You for Attention !!

Any Questions ?

"Imagination is more important than knowledge. Knowledge is limited. Imagination encircles the world."

Albert Einstein