

Maharashtra Shikshan Samiti's

# Maharashtra Mahavidyalaya, Nilanga

Department of Mathematics

SOP: Latex for Beginners-II



Class: B.Sc TY, Sem: VI(2021-22)

Subject: SEC (Skill C)

Prepared by:

**Dr. Sachin P. Basude,**

Department of Mathematics,

Maharashtra Mahavidyalaya,

Nilanga, Dist. Latur 413521

## 1. Tables, Arrays and Lists.

```

\documentclass[paper=a4,12pt]{article}
\usepackage{amsmath}
\begin{document}
The \emph{characteristic polynomial}
 $\chi(\lambda)$  of the
 $3 \times 3$ -matrix

$$\begin{pmatrix} a & b & c \\ d & e & f \\ g & h & i \end{pmatrix}$$

is given by the formula

$$\chi(\lambda) = \begin{vmatrix} \lambda - a & -b & -c \\ -d & \lambda - e & -f \\ -g & -h & \lambda - i \end{vmatrix}.$$

\[\chi(\lambda) = \left| \begin{array}{ccc} \lambda - a & -b & -c \\ -d & \lambda - e & -f \\ -g & -h & \lambda - i \end{array} \right|.\]
\vspace{10}

```

The characteristic polynomial  $\chi(\lambda)$  of the  $3 \times 3$  matrix

$$\begin{pmatrix} a & b & c \\ d & e & f \\ g & h & i \end{pmatrix}$$

is given by the formula

$$\chi(\lambda) = \begin{vmatrix} \lambda - a & -b & -c \\ -d & \lambda - e & -f \\ -g & -h & \lambda - i \end{vmatrix}.$$

```

\[\begin{array}{lcr}
\mbox{First number} & x & 8 \\
\mbox{Second number} & y & 15 \\
\mbox{Sum} & x + y & 23 \\
\mbox{Difference} & x - y & -7 \\
\mbox{Product} & xy & 120 \end{array}\]

```

First number	$x$	8
Second number	$y$	15
Sum	$x + y$	23
Difference	$x - y$	-7
Product	$xy$	120

```
\vspace{10}
```

```

\[\left| x \right| = \left\{ \begin{array}{l} x \text{ \& \mbox{if } \$x \geq 0\$;} \\ -x \text{ \& \mbox{if } \$x < 0\$}. \end{array} \right.\]
\right. \]

```

$$|x| = \begin{cases} x & \text{if } x \geq 0; \\ -x & \text{if } x < 0. \end{cases}$$

```
\newpage
```

```
\begin{center}
```

```
\begin{tabular}{ccc}
```

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

```
cell1 cell2 cell3
cell4 cell5 cell6
cell7 cell8 cell9
```

```
\vspace{10}
```

```
\begin{center}
\begin{tabular}{|c c c c|}
\hline
Col1 & Col2 & Col2 & Col3 \\ \hline\hline
1 & 6 & 87837 & 787 \\ \hline
2 & 7 & 78 & 5415 \\ \hline
3 & 545 & 778 & 7507 \\ \hline
4 & 545 & 18744 & 7560 \\ \hline
\end{tabular}
\end{center}
```

```
\hline
5 & 88 & 788 & 6344 \\ [1ex]
\hline
\end{tabular}
\end{center}
```

Col1	Col2	Col2	Col3
1	6	87837	787
2	7	78	5415
3	545	778	7507
4	545	18744	7560
5	88	788	6344

```
\listoftables
\vspace{5pt}
The table \ref{table:1} is an example of
referenced \LaTeX{} elements.
\begin{table}[h!]
```

```
\centering
\begin{tabular}{|c c c c|}
\hline
Col1 & Col2 & Col2 & Col3 \\ \hline\hline
```

```

1 & 6 & 87837 & 787 \\
2 & 7 & 78 & 5415 \\
3 & 545 & 778 & 7507 \\
4 & 545 & 18744 & 7560 \\
5 & 88 & 788 & 6344 \\[1ex]
\hline
\end{tabular}
\caption{This is the caption for the first
table.}
\label{table:1}
\end{table}

```

```

\begin{table}[h!]
\centering
\begin{tabular}{|c c c c|}
\hline
Col1 & Col2 & Col2 & Col3 \\[0.5ex]
\hline\hline
4 & 545 & 18744 & 7560 \\

```

```
\newpage
```

```

\begin{enumerate}
\item First level item
\item First level item
\begin{enumerate}
\item Second level item
\item Second level item
\begin{enumerate}
\item Third level item
\item Third level item
\begin{enumerate}
\item Fourth level item
\item Fourth level item
\end{enumerate}
\end{enumerate}
\end{enumerate}
\end{enumerate}
\end{enumerate}
\vspace{10}

```

```

\begin{itemize}
\item First level item
\item First level item
\begin{itemize}
\item Second level item

```

```

5 & 88 & 788 & 6344 \\[1ex]
\hline
\end{tabular}
\caption{This is the caption for the second
table.}
\label{table:2}
\end{table}

```

List of Tables

- 1 This is the caption for the first table. . . . .
  - 2 This is the caption for the second table. . . . .
- The table 1 is an example of referenced L<sup>A</sup>T<sub>E</sub>X elements.

Col1	Col2	Col2	Col3
1	6	87837	787
2	7	78	5415
3	545	778	7507
4	545	18744	7560
5	88	788	6344

Table 1: This is the caption for the first table.

Col1	Col2	Col2	Col3
4	545	18744	7560
5	88	788	6344

Table 2: This is the caption for the second table.

1. First level item
2. First level item
  - (a) Second level item
  - (b) Second level item
    - i. Third level item
    - ii. Third level item
      - A. Fourth level item
      - B. Fourth level item

```

\item Second level item
\begin{itemize}
\item Third level item
\item Third level item
\begin{itemize}

```

```
\item Fourth level item
\item Fourth level item
\end{itemize}
\end{itemize}
\end{itemize}
\end{itemize}
```

- First level item
- First level item
  - Second level item
  - Second level item
    - \* Third level item
    - \* Third level item
      - Fourth level item
      - Fourth level item

```
\end{document}
```

## 2. Theorem.

```
\documentclass{article}
\usepackage[english]{babel}
\newtheorem{theorem}{Theorem}
\newtheorem{theorem}{Theorem}[section]
\newtheorem{corollary}{Corollary}[theorem]
\newtheorem{lemma}{Lemma}[theorem]
```

```
\begin{document}
\section{Introduction}
Theorems can easily be defined:
\begin{theorem}
Let  $f$  be a function whose derivative exists in every point, then  $f$ 
is a continuous function.
\end{theorem}
```

### 1 Introduction

Theorems can easily be defined:

**Theorem 1** *Let  $f$  be a function whose derivative exists in every point, then  $f$  is a continuous function.*

```
\vspace{20}
\section{Introduction}
Theorems can easily be defined:
\begin{theorem}
Let  $f$  be a function whose derivative exists in every point, then  $f$  is
a continuous function.
\end{theorem}
```

### 2 Introduction

Theorems can easily be defined:

**Theorem 2** *Let  $f$  be a function whose derivative exists in every point, then  $f$  is a continuous function.*

```
\begin{theorem}[Pythagorean theorem]
\label{pythagorean}
This is a theorem about right triangles and can be summarised in the next
equation

$$x^2 + y^2 = z^2$$

\end{theorem}
```

And a consequence of theorem `\ref{pythagorean}` is the statement in the next corollary.

```
\begin{corollary}
There's no right rectangle whose sides measure 3cm, 4cm, and 6cm.
\end{corollary}
```

You can reference theorems such as `\ref{pythagorean}` when a label is assigned.

```
\begin{lemma}
Given two line segments whose lengths are \(a\) and \(b\) respectively there is a
real number \(r\) such that \(b=ra\).
\end{lemma}
```

**Theorem 3 (Pythagorean theorem)** *This is a theorem about right triangles and can be summarised in the next equation*

$$x^2 + y^2 = z^2$$

And a consequence of theorem 3 is the statement in the next corollary.

**Corollary 3.1** *There's no right rectangle whose sides measure 3cm, 4cm, and 6cm.*

You can reference theorems such as 3 when a label is assigned.

**Lemma 4** *Given two line segments whose lengths are  $a$  and  $b$  respectively there is a real number  $r$  such that  $b = ra$ .*

```
\vspace{10}
\begin{lemma}
Given two line segments whose lengths are \(a\) and \(b\) respectively there
is a real number \(r\) such that \(b=ra\).
\end{lemma}
```

```
\begin{proof}
To prove it by contradiction try and assume that the statement is false,
proceed from there and at some point you will arrive to a contradiction.
\end{proof}
```

**Lemma 5** *Given two line segments whose lengths are  $a$  and  $b$  respectively there is a real number  $r$  such that  $b = ra$ .*

To prove it by contradiction try and assume that the statement is false, proceed from there and at some point you will arrive to a contradiction.

```
\end{document}
```

### 3. Referencing.

#### Bibliography management: BibTeX

B.Sc TY Students

May 12, 2022

#### Contents

1	First Section	1
	References	1

#### 1 First Section

This document is an example of BibTeX using in bibliography management. Three items are cited: *The L<sup>A</sup>T<sub>E</sub>X Companion* book [2], the Einstein journal paper, and the Donald Knuth's website [1]. The L<sup>A</sup>T<sub>E</sub>X related items are [2].

#### References

- [1] Donald E. Knuth (1986) *The T<sub>E</sub>X Book*, Addison-Wesley Professional.
- [2] Leslie Lamport (1994) *L<sup>A</sup>T<sub>E</sub>X: a document preparation system*, Addison Wesley, Massachusetts, 2nd ed.

```

\documentclass[a4paper,10pt]{article}
\usepackage[english]{babel}
\usepackage[nottoc]{tocbibind}
\title{Bibliography management: BibTeX}
\author{B.Sc TY Students}
\begin{document}
\maketitle
\tableofcontents
\medskip
\section{First Section}
This document is an example of BibTeX using in bibliography management. Three items are
cited: \textit{The LATEX Companion} book \cite{lampport94}, the Einstein journal paper,
and the Donald Knuth's website \cite{texbook}. The LATEX related items are
\cite{lampport94}.
\medskip
\begin{thebibliography}{9}
\bibitem{texbook}
Donald E. Knuth (1986) \emph{The TEX Book}, Addison-Wesley Professional.
\bibitem{lampport94}
Leslie Lamport (1994) \emph{LATEX: a document preparation system}, Addison
Wesley, Massachusetts, 2nd ed.
\end{thebibliography}
\end{document}

```



## 4. Journal Article/Reports

*Journal: NETWORK NEUROSCIENCE*

---

RESEARCH

**<Title of Article>: <Subtitle Here>**

Author Names with affiliations<sup>1</sup>, Another Name<sup>2</sup>, Still another Name<sup>2</sup>,  
and Final Name<sup>1</sup>

<sup>1</sup>Department, Institution, City, Country

<sup>2</sup>Another Department, Institution, City, Country

Keywords: [a series of capitalized words, separated with commas]

ABSTRACT

Abstract text here.

AUTHOR SUMMARY

Author Summary here.

[Body of article. See NETNSample.tex for examples of all of the elements available for use in an NETN manuscript, including text boxes, lists, citations and references, and Technical Terms.]

ACKNOWLEDGMENTS

SUPPORTING INFORMATION

COMPETING INTERESTS

TECHNICAL TERMS

TECHNICAL TERMS

```

\documentclass[NETN,manuscript]{stjour-new}
\articletype{Research}

\def\taupav{\tau_{\mathrm{Pav}}}
\begin{document}

\title{<Title of Article>}
\subtitle{<Subtitle Here>}

\author[Author Names]
{Author Names with affiliations\affil{1},
Another Name\affil{2}, Still another Name\affil{2},\
and Final Name\affil{1}}

\affiliation{1}{Department, Institution, City, Country}
\affiliation{2}{Another Department, Institution, City, Country}
\correspondingauthor{Author Name}{Corresponding author email address}
\keywords{[a series of capitalized words, separated with commas]}
\begin{abstract}
Abstract text here.

```

```

\end{abstract}
\begin{authorsummary}
Author Summary here.
\end{authorsummary}
[Body of article.
See NETNSample.tex for examples of all of the elements available for use in an NETN
manuscript, including text boxes, lists, citations and references, and Technical Terms.]

\acknowledgments
\section{Supporting Information}
\section{Competing Interests}
\section{Technical Terms}
\bibliography{<your .bib file>}
\section{Technical Terms}

\end{document}

```

The examples below may be helpful when you are looking for a quick example. They are taken from NETNSample.tex so you can see their results in NETNSample.pdf

```

\begin{boxedtext} {box title}
Text
\end{boxedtext}

```

or, put figure in boxed text:

```

\begin{boxedtext} {box title}
Text
\begin{figure}
illustration
\caption{caption here}
\end{figure}
\end{boxedtext}

```

or, put table in boxed text:

```

\begin{boxedtext} {box title}
Text
\begin{table}
\caption{caption here}
tabular...
\end{table}
\end{boxedtext}

```

```

\bibliography{bibsamp}

```

NO APPENDICES allowed in the Network Neuroscience Style.

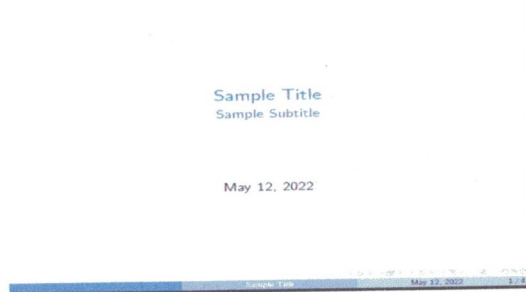
Please submit Supporting Information documents as PDFs in a format ready to publish.

## 5. Presentation in Latex

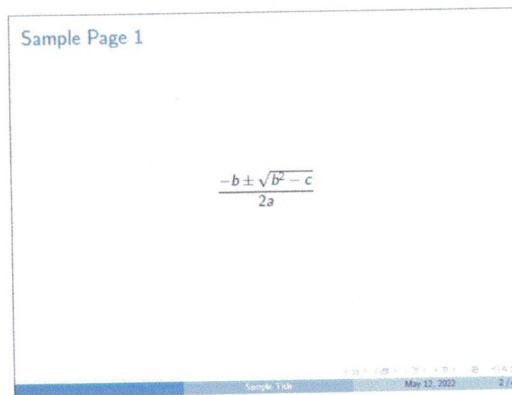
```
\documentclass{beamer}
\usetheme{Boadilla}
\title{Sample Title}
\subtitle{Sample Subtitle}

\begin{document}

\frame{\titlepage}
```



```
\frame {
\frametitle{Sample Page 1}
\[\frac{-b \pm \sqrt{b^2 - c}}{2a}\]}
}
```



```
\begin{frame}
\frametitle{List}
```

```
\begin{itemize}
\item Point A
\item Point B
\begin{itemize}
\item part 1
\item part 2
\end{itemize}
\item Point C
\item Point D
\end{itemize}
\end{frame}
```

List

- Point A
- Point B
  - part 1
  - part 2
- Point C
- Point D

```
\frame{
\frametitle{Paragraph Content}
This is a paragraph.
}
```

Paragraph Content

This is a paragraph.

```
\end{document}
```



  
**Principal**  
Principal  
Maharashtra Mahavidyalaya  
Nilanga-413521 Dist.Latur