An Introduction To LATEX

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Workshop-Outcomes

Participants are able

- To write technical paper for a specified journal
- To develop a presentation and posters
- To write technical report

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Overleaf Introduction

- Overleaf is a collaborative cloud-based LaTeX editor used for writing, editing and publishing scientific documents
- It partners with a wide range of scientific publishers to provide official journal LaTeX templates

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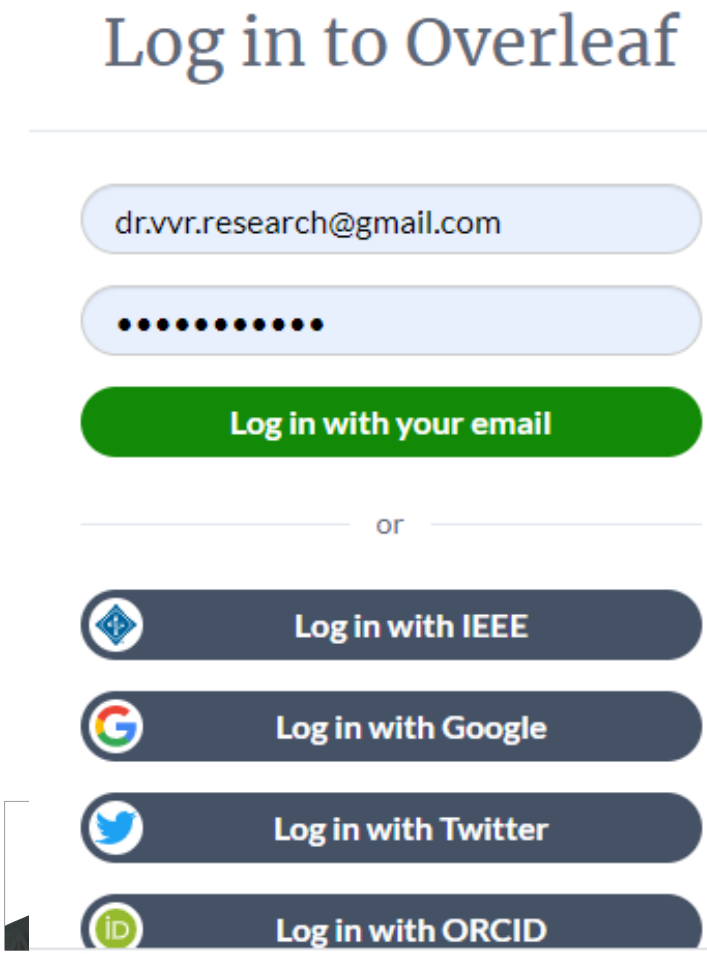
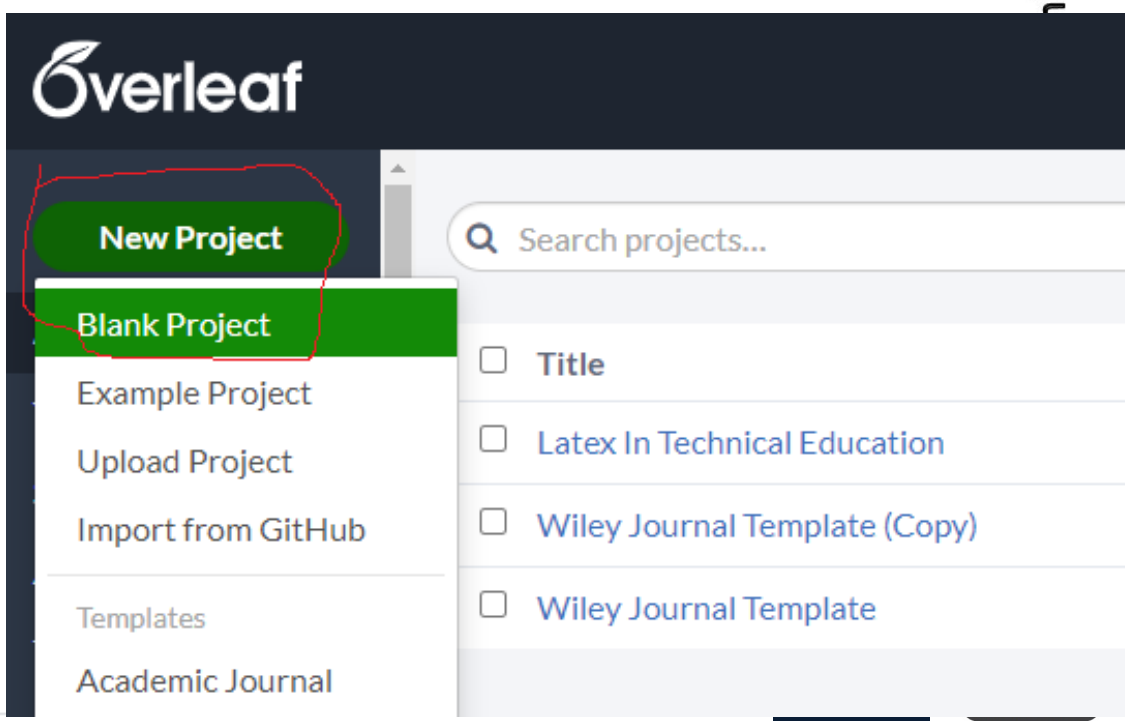
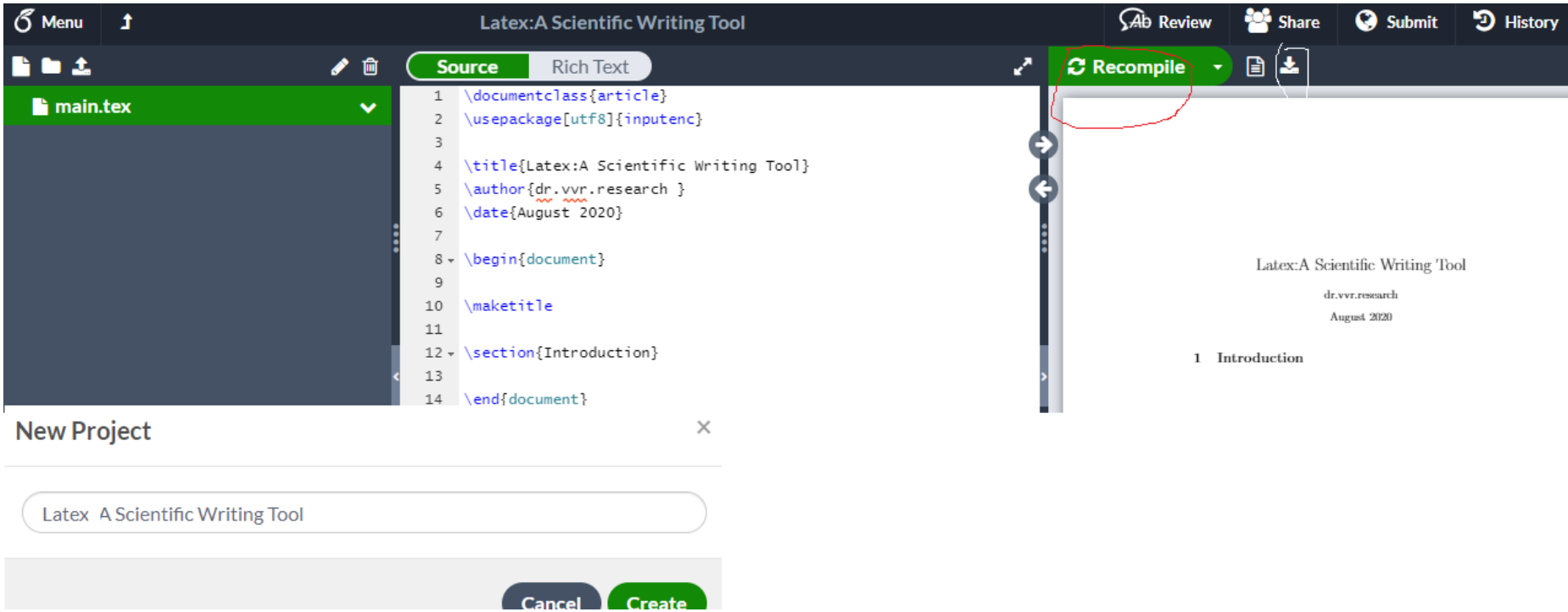
- Login to overleaf
  `https://www.overleaf.com/login`






Menu
Latex:A Scientific Writing Tool
Review
Share
Submit
History
Source
Rich Text
Recompile
main.tex
1 \documentclass{article}
2 \usepackage[utf8]{inputenc}
3
4 \title{Latex:A Scientific Writing Tool}
5 \author{dr.vvr.research }
6 \date{August 2020}
7
8 \begin{document}
9
10 \maketitle
11
12 \section{Introduction}
13
14 \end{document}
Latex:A Scientific Writing Tool
dr.vvr.research
August 2020
1 Introduction
New Project
Latex A Scientific Writing Tool
Cancel
Create

Installation

- LaTeX compiler: MiKTeX `https://miktex.org/download`
- Preferred LaTeX editor: Texmaker `https://texmaker.en.softonic.com/download`

Source file: .tex
Output file: .pdf

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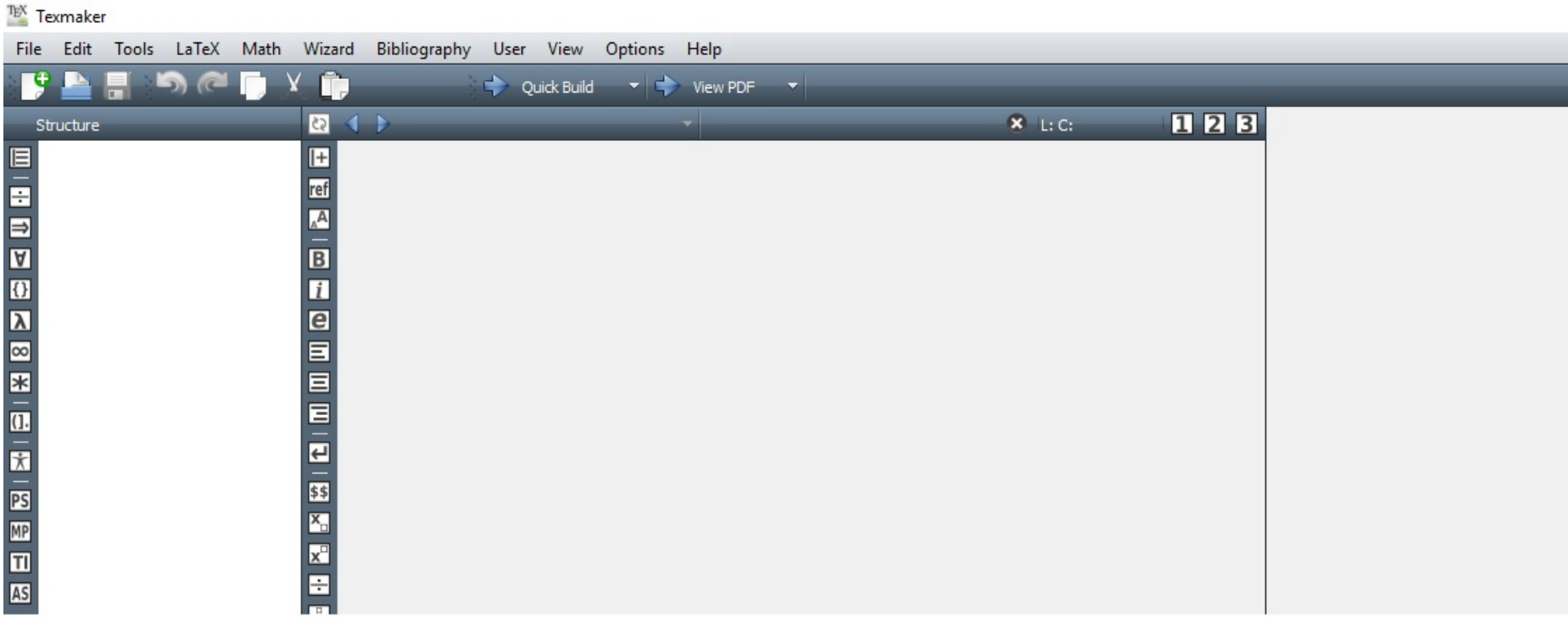
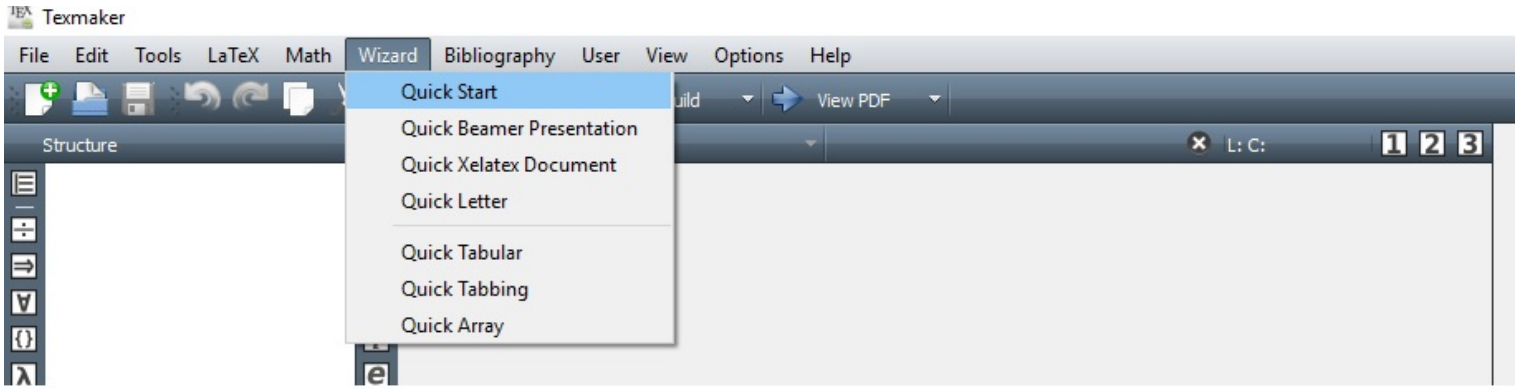
Open LATEX using TEX maker



Open LATEX using TEX maker



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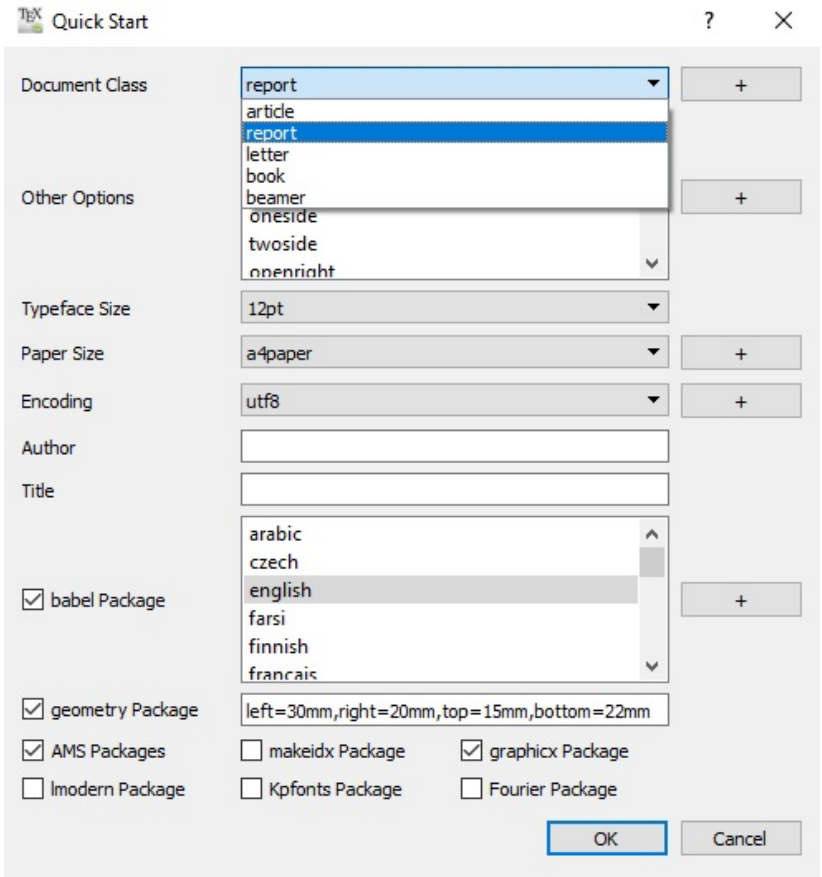

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\maketitle : To print title
\begin{abstract}...\end{abstract} for abstract writing
\tableofcontents: to print table of contents

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\chapterName: In case of chapter for report or book
\sectionName: In case of section in articles
\subsectionName: In case of subsection in articles
\subsubsectionName: In case of subsubsection in articles
Each section/chapter can be referred by its label using command \ref{labelname}

\\ or \newline to move to next line
Page break: \newpage

\vspace{1cm} leaves 1cm vertical space
\hspace{1cm} leaves 1cm horizontal space

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FONT COLOR

usepackage{**xcolor**} This package is for adjusting font color

\color{blue}

My name is venkataramana

\color{green}

My name is venkataramana

\color{cyan}

My name is venkataramana

\color{red}

My name is venkataramana

Email ID: (vvr.nitw@ieee.org)

\color{purple}
My name is venkataramana
\color{black}
My name is venkataramana
\color{magenta}
My name is venkataramana
\color{pink}
My name is venkataramana
\color{brown}
My name is venkataramana
\color{gray}
My name is venkataramana

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\color{lime}
My name is venkataramana
\color{orange}
My name is venkataramana
\color{darkgray}
My name is venkataramana
\color{lightgray}
My name is venkataramana
\color{teal}
My name is venkataramana
\color{violet}
My name is venkataramana
\color{yellow}
My name is venkataramana

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Font Size

Default latex use a font size of 10pt (depending of the used documentclass article, report, book and letter) . This could be changed to 11pt or 12pt as a option of documentclass
The beamer class for presentation has 8 font sizes: 8pt, 9pt, 10pt, 11pt, 12pt, 14pt, 17pt and 20pt.

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My name is venkataramana
\tiny **My name is venkataramana**
My name is venkataramana
\scriptsize **My name is venkataramana**
My name is venkataramana
\footnotesize **My name is venkataramana**
My name is venkataramana
\small **My name is venkataramana**
My name is venkataramana
\normalsize **My name is venkataramana**
My name is venkataramana
\large **My name is venkataramana**
My name is venkataramana
\Large **My name is venkataramana**

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My name is venkataramana

\LARGE My name is venkataramana

My name is venkataramana

\huge My name is venkataramana

Email ID: (vvr.nitw@ieee.org)

\textbf{Venkataramana Veeramstty}::Bold
\textit{Venkataramana Veeramstty}::italic
\textsc{Venkataramana Veeramstty}::Small Caps
\texttt{Venkataramana Veeramstty}:: Type Writing

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	Standard Font Size		
command	10pt	11pt	12pt
\tiny	5pt	6pt	6pt
\scriptsize	7pt	8pt	8pt
\footnotesize	8pt	9pt	10pt
\small	9pt	10pt	11pt
\normalsize	10pt	11pt	12pt
\large	12pt	12pt	14pt
\Large	14pt	14pt	17pt
\LARGE	17pt	17pt	20pt
\huge	20pt	20pt	25pt
\Huge	25pt	25pt	25pt

Email ID: (vvr.nitw@ieee.org)

Text my name is venkataramana veeramsetty, my father nale is suryanarayanaya

Text my name is venkataramana veeramsetty, my father nale is suryanarayanaya

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Table Creation

```
\begin{table}[h]
\centering
\caption{Demo1}
\begin{tabular}{|c|c|c|}
\hline
Name & Marks & Grade\\
\hline
Ram & 56 & P\\
Venkat & 85 & A\\
Raj & 85 & Ex\\
\hline
\end{tabular}
\end{table}
```

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Table Creation

Table 1: Demo1

Name	Marks	Grade
Ram	56	P
Venkat	85	A
Raj	85	Ex

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Table Creation:Row separated with line

```
\begin{table}[h]
\centering
\caption{Demo2}
\begin{tabular}{|c|c|c|}
\hline
Name & Marks & Grade\\
\hline
Ram & 56 & P\\
\hline
Venkat & 85 & A\\
\hline
Raj & 85 & Ex\\
\hline
\end{tabular}
\end{table}
```

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Table Creation:Row separated with line

Table 2: Demo2

Name	Marks	Grade
Ram	56	P
Venkat	85	A
Raj	85	Ex

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Table Creation:left alignment

```
\begin{table}[h]
\centering
\caption{Demo3}
\begin{tabular}{|l|l|l|}
\hline
Name & Marks & Grade\\
\hline
Ram & 56 & P\\
\hline
Venkat & 85 & A\\
\hline
Raj & 85 & Ex\\
\hline
\end{tabular}
\end{table}
```

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Table Creation:left alignment

Table 3: Demo3

Name	Marks	Grade
Ram	56	P
Venkat	85	A
Raj	85	Ex

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Table Creation:right alignment

```
\begin{table}[h]
\centering
\caption{Demo4}
\begin{tabular}{|r|r|r|}
\hline
Name & Marks & Grade\\
\hline
Ram & 56 & P\\
\hline
Venkat & 85 & A\\
\hline
Raj & 85 & Ex\\
\hline
\end{tabular}
\end{table}
```

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Table Creation:right alignment

Table 4: Demo4

Name	Marks	Grade
Ram	56	P
Venkat	85	A
Raj	85	Ex

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Table Creation:adjustable row width

```
\begin{table}[h]
\centering
\caption{Demo3}
\begin{tabular}
{|p{3cm}|p{3cm}|p{3cm}|}
\hline
Name & Marks & Grade\\
\hline
Ram & 56 & P\\
\hline
Venkat & 85 & A\\
\hline
Raj & 85 & Ex\\
\hline
\end{tabular}
\end{table}
```

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Table Creation:adjustable row width

Table 5: Demo5

Name	Marks	Grade
Ram	56	P
Venkat	85	A
Raj	85	Ex

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Table by adjusting total width

\usepackage{adjustbox}

```
\begin{table}[h]
\centering
\caption{Demo6}
\begin{adjustbox}{max width=10cm}
\begin{tabular}{|r|r|r|r|r|r|r|r|r|}
\hline
Name & Marks & Grade&Name & Marks &
Grade&Name & Marks & Grade\\
\hline
Ram & 56 & P&Ram & 56 & P&Ram & 56 & P\\
\hline
Venkat & 85 & A&Ram & 56 & P&Ram & 56 & P\\
\hline
Raj & 85 & Ex&Ram & 56 & P&Ram & 56 & P\\
\hline
\end{tabular}
\end{adjustbox}
```

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Table by adjusting total width

Table 6: Demo6

Name	Marks	Grade	Name	Marks	Grade	Name	Marks	Grade
Ram	56	P	Ram	56	P	Ram	56	P
Venkat	85	A	Ram	56	P	Ram	56	P
Raj	85	Ex	Ram	56	P	Ram	56	P

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Table with merged columns

```
\begin{table}[h]
\centering
\caption{Demo5}
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|}
\hline
\multicolumn{3}{|c|}{Marks \& Grades}\\
\hline
Name & Marks & Grade\\
\hline
Ram & 56 & P\\
\hline
Venkat & 85 & A\\
\hline
Raj & 85 & Ex\\
\hline
\end{tabular}
\end{table}
```

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Table with merged columns

Table 7: Demo5

Marks & Grades		
Name	Marks	Grade
Ram	56	P
Venkat	85	A

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Table with merged rows

```
\begin{table}[h]
\centering
\caption{Demo5}
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|}
\hline
Name & Marks & Grade\\
\hline
\multirow{2}{*}{Ram} & 56 & P\\
& 85 & A\\
\hline
\end{tabular}
\end{table}
```

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Table with merged rows

Table 8: Demo5

Name	Marks	Grade
Ram	56 85	P A

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Insertion of Figures in Latex Document

```
\begin{figure}
\includegraphics[scale=1]{SRlogo.jpg}
\caption{SR logo}
\end{figure}
```

Figure 1: SR logo

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Insertion of Figures in Latex Document

```
\includegraphics[width=3cm,
height=4cm]{SRlogo.jpg}
```

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Figure 2: SR logo - Width and Height

Insertion of Figures in Latex Document

```
\includegraphics[scale=0.5, angle=45]{SRlogo.jpg}
```

Figure 3: SR logo - Scale and Angle

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Figure with textwidth

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Figure Position

Place the figure exactly below this text, use float as shown below

```
\begin{figure}[float]
\includegraphics[scale=1]{SRlogo.jpg}
\caption{SR logo}
\end{figure}
```

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float information

Table 9: float information

Parameter	Description
h	Place the float here
t	Position at the top of the page
b	Position at the bottom of the page
p	Put on a special page for floats only

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Equations

Need \usepackage{amsmath}
Cost of generation shown in equation (1).

$$cost = a_i P_i^2 + b_i P_i + c_i \tag{1}$$

Code:

```
\begin{equation}
\label{eq1}
cost=a_{i}P_{i}^{2}+b_{i}P_{i}+c_{i}
\end{equation}
```

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eqnarray

$$F = ma \tag{2}$$

$$a = \frac{du}{dt} \tag{3}$$

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Code:

```
\begin{eqnarray}
F=ma\\
a=\frac{du}{dt}
\end{eqnarray}
```

eqnarray

$$\Phi = \sqrt[10]{\frac{a}{b}} \tag{4}$$

$$\lim_{x \rightarrow 0} \frac{sinx}{x} = 1 \tag{5}$$

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Code:

```
\begin{eqnarray}
\Phi=\sqrt[10]{\frac{a}{b}}\\
\lim_{x \rightarrow 0}\frac{sin x}{x}=1
\end{eqnarray}
```

Equations

```
\begin{equation}
Cost=\sum_{i=1}^{Ng} a_{i}P_{i}^{2}+b_{i}P_{i}+c_{i}
\end{equation}
```

$$Cost = \sum_{i=1}^{Ng} a_i P_i^2 + b_i P_i + c_i \tag{6}$$

Equations

```
\begin{equation}
P_{i}=\frac{\lambda - b_{i}}{2a_{i}}
\end{equation}
```

$$P_i = \frac{\lambda - b_i}{2a_i} \tag{7}$$

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Equations

Emission released from EG can be computed using equation \ref{eq8}.

```
\begin{equation}
\label{eq8}
\begin{split}
{EC_{EG}}^{k}=\sum_{i=1}^{N_{EG}}({SO_{2}}^{EG_{i}}
P_{SO_{2}}+{CO_{2}}^{EG_{i}}P_{CO_{2}}+\\{CO}^{EG_{i}}
P_{CO}+{NO_{x}}^{EG_{i}}P_{NO_{x}})({PG^{k}})_{i}^{j}+\\
({SO_{2}}^{Sub}P_{SO_{2}}+{CO_{2}}^{Sub}P_{CO_{2}}+{CO^{Sub}}
P_{CO}\\+{NO_{x}}^{Sub}
P_{NO_{x}})*({P_{Load}}^{k}+{Ploss_{j}}^{k}-\sum_{i}^{N_{EG}}
({PG^{k}})_{i}^{j})
\end{split}
\end{equation}
```

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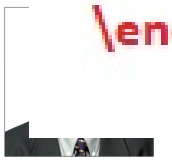

Equations Split

Need \usepackage{mathtools}

$$EC_{EG}{}^{k} = \sum_{i=1}^{N_{EG}} (SO_2{}^{EG_i} P_{SO_2} + CO_2{}^{EG_i} P_{CO_2} + CO^{EG_i} P_{CO} + NO_x{}^{EG_i} P_{NO_x})(PG^k)_i^j + \tag{8}$$

$$(SO_2{}^{Sub} P_{SO_2} + CO_2{}^{Sub} P_{CO_2} + CO^{Sub} P_{CO} + NO_x{}^{Sub} P_{NO_x}) * (P_{Load}{}^{k} + Ploss_j{}^{k} - \sum_{i}^{N_{EG}} (PG^k)_i^j)$$

```
\begin{equation}
\label{eq8}
\begin{split}
{EC_{EG}}^{k}=\sum_{i=1}^{N_{EG}}({SO_{2}}^{EG_{i}}
P_{SO_{2}}+{CO_{2}}^{EG_{i}}P_{CO_{2}}+\\{CO}^{EG_{i}}
P_{CO}+{NO_{x}}^{EG_{i}}P_{NO_{x}})({PG^{k}})_{i}^{j}+\
\
({SO_{2}}^{Sub}P_{SO_{2}}+{CO_{2}}^{Sub}P_{CO_{2}}+
{CO^{Sub}}P_{CO}\\+{NO_{x}}^{Sub}
P_{NO_{x}})*({P_{Load}}^{k}+{Ploss_{j}}^{k}-\sum_{i}
^{N_{EG}}({PG^{k}})_{i}^{j})
\end{split}
```

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Equation Symbols

Latex Code	Math Eq
x_{i}	x_i
x_{1,2}	$x_{1,2}$
, x^{i}	x^i
\sum_{i=1}^{n}	$\sum_{i=1}^{n}$
\int_{i=1}^{n}	$\int_{i=1}^{n}$
\frac{a}{b}	$\frac{a}{b}$
\sqrt[3]{x}	$\sqrt[3]{x}$

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Brackets

Latex Code	Math Eq
(\frac{x}{y})	$(\frac{e^x}{e^y})$
\left(frac{x}{y}\right)	$\left(\frac{e^x}{e^y}\right)$
\left[frac{x}{y}\right]	$\left[\frac{e^x}{e^y}\right]$
\left\langle frac{x}{y}\right\rangle	$\left\langle\frac{e^x}{e^y}\right\rangle$
\left\lbrace frac{x}{y}\right\rbrace	$\left\lbrace\frac{e^x}{e^y}\right\rbrace$

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Arrays and Matrices

```
$\begin{array}{cc}
a & b\\
c & d
\end{array}$
```

$$\begin{array}{cc} a & b \\ c & d \end{array}$$

```
$\begin{matrix}
a & b\\
c & d
\end{matrix}$
```

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

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```
$\begin{pmatrix}
a  &  b\\
c  &  d
\end{pmatrix}$\\
```

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

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

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

Email ID: (vvr.nitw@ieee.org)

```
$\begin{vmatrix}
a & b\\
c & d
\end{vmatrix}$
```

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

```
$\begin{Vmatrix}
a & b\\
c & d
\end{Vmatrix}$
```

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

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```
$f(x) = \left \{\begin{array}{cl}
0 & x\leq 0\\
1 & x>0
\end{array}\right.$
```

$$f(x) = \begin{cases} 0 & x \leq 0 \\ 1 & x > 0 \end{cases}$$

Chemical Equations

$$6CO_2 + 6H_2O \xrightarrow{Light-Energy} C_6H_{12}O_6 + 6CO_2 \quad (9)$$

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Nomenclature

```
\usepackage{nomencl}
\makenomenclature

\printnomenclature[2cm]
\nomenclature{${EC_{EG}}^{k}$}{Emission cost due to EG at hour k}
```

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$EC_{EG}{}^{k}$ Emission cost due to EG at hour k

Lists

Benefits due to DG integration

- Loss reduction
- Voltage improvement
- Loss reduction

```
\begin{itemize}
\item Loss reduction
\item Voltage improvement
\item Loss reduction
\end{itemize}
```

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Benefits due to DG integration

1. Loss reduction
2. Voltage improvement
3. Loss reduction

```
\begin{enumerate}
\item Loss reduction
\item Voltage improvement
\item Loss reduction
\end{enumerate}
```

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Benefits due to DG integration

Benefit1: Loss reduction

Benefit2: Voltage improvement

Benefit3: Loss reduction

```
\begin{itemize}
\addtolength{\itemindent}{1cm}
\item[Benefit1:] Loss reduction
\item[Benefit2:] Voltage improvement
\item[Benefit3:] Loss reduction
\end{itemize}
```

Email ID: (vvr.nitw@ieee.org)

Benefits due to DG integration

- √ Loss reduction
- √ Voltage improvement
- √ Loss reduction

```
\begin{itemize}
\item[$\surd$] Loss reduction
\item[$\surd$] Voltage improvement
\item[$\surd$] Loss reduction
\end{itemize}
```

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Line spacing

- \renewcommand{\baselinestretch}{1.5}
- singlespace
- onehalfspace
- doublespace

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Biblography

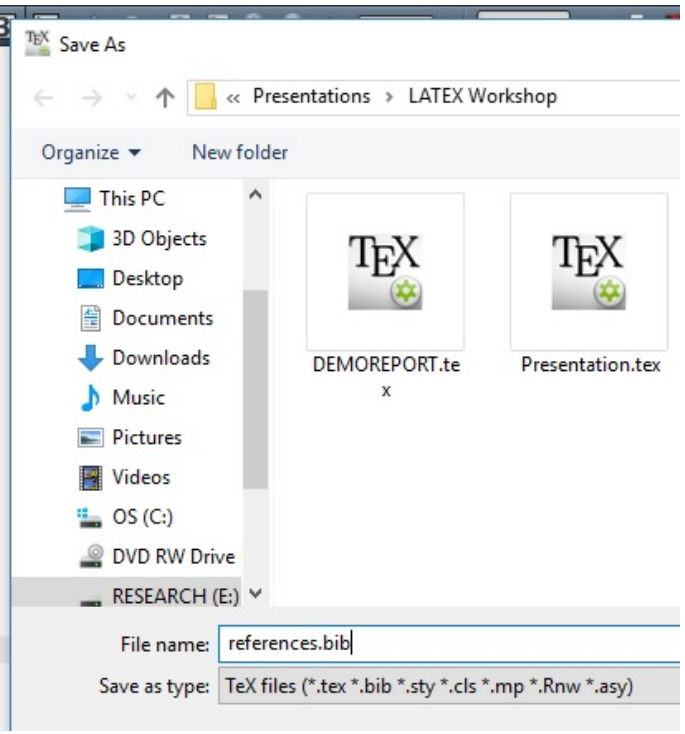
- Open new file
- Copy BiBtex code for each article (with unique label) from GoogleScholar and past in new file
- save this new file with extension .bib

Email ID: (vvr.nitw@ieee.org)

untitled2 L: 19 C: 2

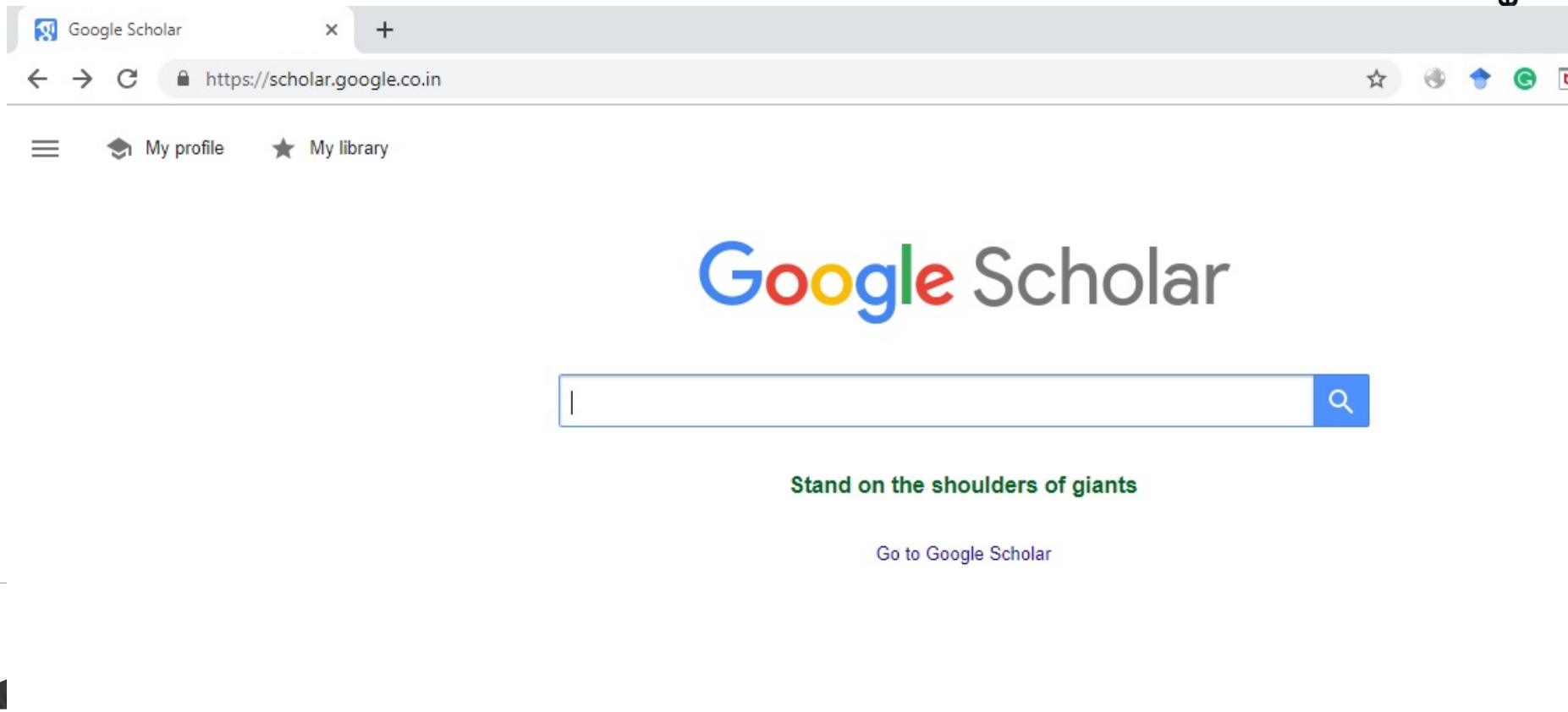
```
@article{veeramsetty2018hybrid,
  title={Hybrid genetic dragonfly algorithm based optimal power flow for computing LMP at DG buses for reliability improvement},
  author={Veeramsetty, Venkataramana and Venkaiah, Chintham and Kumar, DM Vinod},
  journal={Energy Systems},
  volume={9},
  number={3},
  pages={709--757},
  year={2018},
  publisher={Springer}
}

@inproceedings{veeramsetty2012optimal,
  title={Optimal allocation and contingency analysis of Embedded Generation deployment in distribution network using Genetic Algorithm},
  author={Veeramsetty, Venkataramana and Lakshmi, GV Naga and Jayalaxmi, A},
  booktitle={Computing, Electronics and Electrical Technologies (ICCEET), 2012 International Conference on},
  pages={86--91},
  year={2012},
  organization={IEEE}
}
```



How to get Bibtex code from googlescholar

- Open Google scholar



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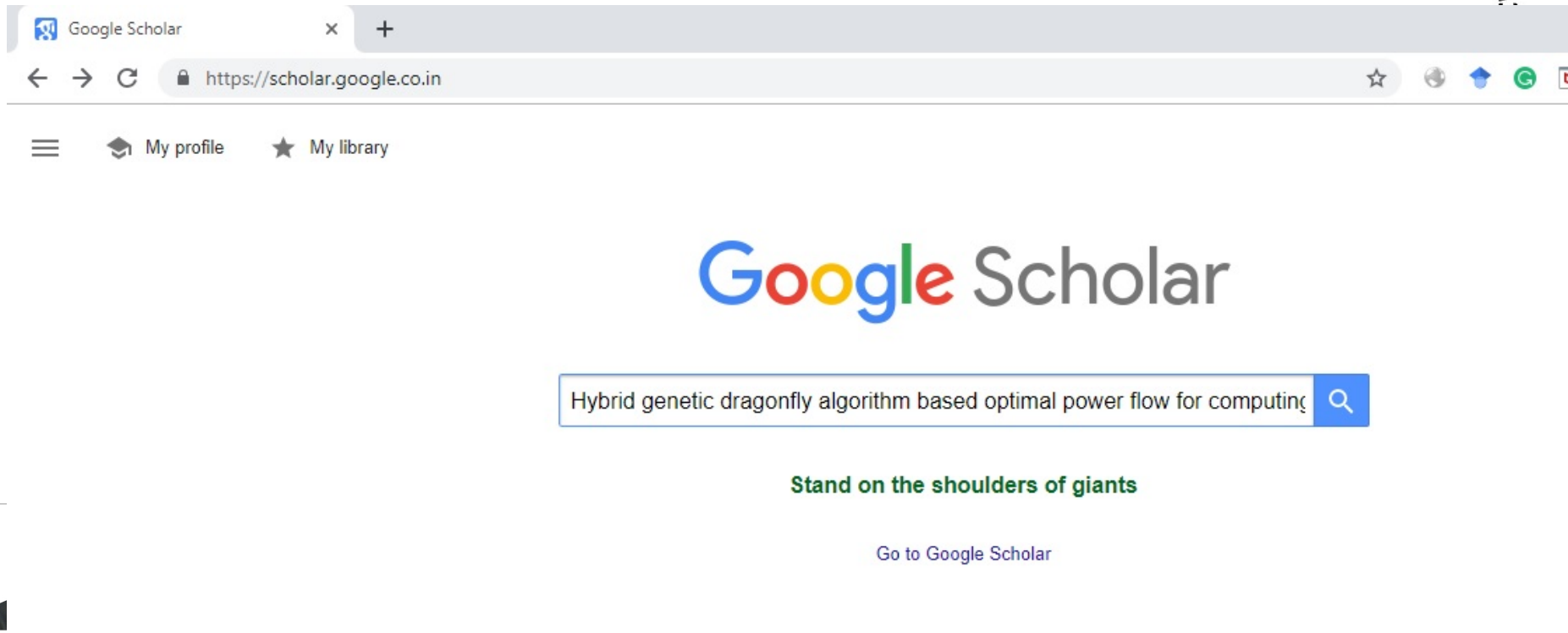

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Hybrid genetic dragonfly algorithm based optimal power flow for computing LMP at DG buses for reliability improvement

V Veeramsetty, C Venkaiah, DMV Kumar - Energy Systems, 2018 - Springer

This paper proposes an hybrid method to compute locational marginal price at distributed generation (DG) buses in order to improve reliability in radial distribution system (RDS). This method consists of optimal power flow based on hybrid genetic dragonfly algorithm which provides incentives to each DG unit based on its contribution to reliability improvement. In this paper expected energy not supplied has been used as a reliability measuring index. The proposed method enables the distribution company (DISCO) to operate the network ...

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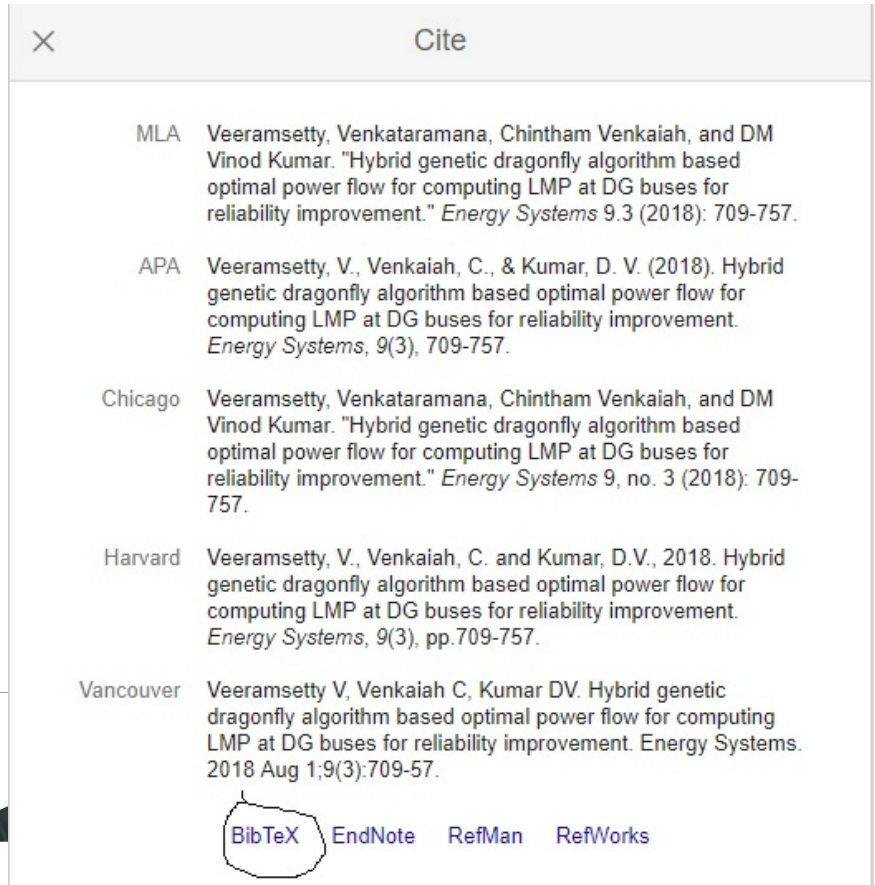

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```
@article{veeramsetty2018hybrid,
  title={Hybrid genetic dragonfly algorithm based optimal power flow for computing LMP at DG buses for reliability improvement},
  author={Veeramsetty, Venkataramana and Venkaiah, Chintham and Kumar, DM Vinod},
  journal={Energy Systems},
  volume={9},
  number={3},
  pages={709--757},
  year={2018},
  publisher={Springer}
}
```

Optimal placement of DG using GA is shown in \cite{veeramsetty2012optimal}and Locational marginal price computed based on reliability in\cite{veeramsetty2018hybrid}.

Optimal placement of DG using GA is shown in [1]and Locational marginal price computed based on reliability in[2].

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[1] V. Veeramsetty, G. N. Lakshmi, and A. Jayalaxmi. Optimal allocation and contingency analysis of embedded generation deployment in distribution network using genetic algorithm. In *Computing, Electronics and Electrical Technologies (ICCEET), 2012 International Conference on*, pages 86–91. IEEE, 2012.

[2] V. Veeramsetty, C. Venkaiah, and D. V. Kumar. Hybrid genetic dragonfly algorithm based optimal power flow for computing lmp at dg buses for reliability improvement. *Energy Systems*, 9(3):709–757, 2018.

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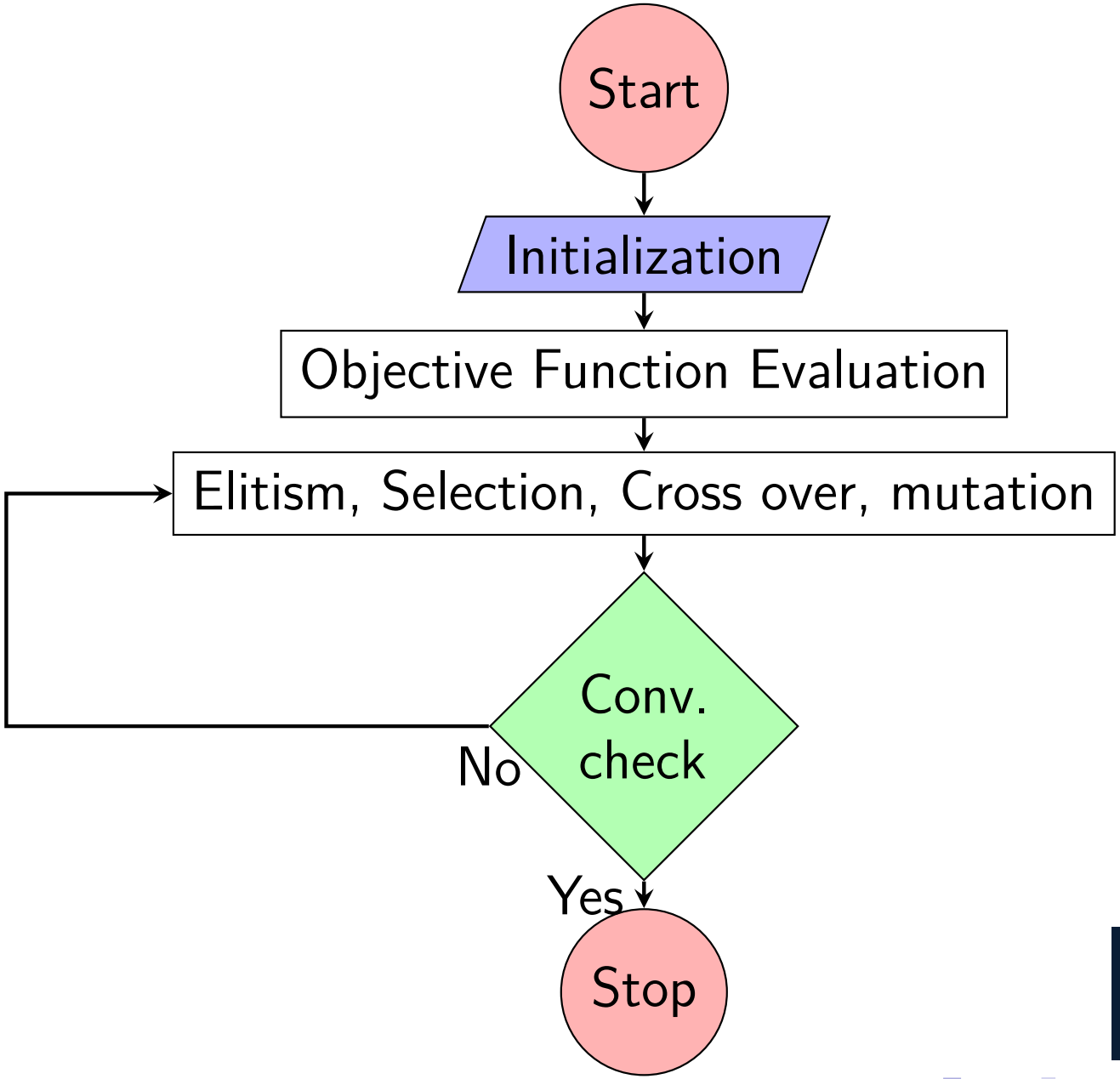
Flowchart using Latex

```
\usepackage{tikz}
\usetikzlibrary{shapes.geometric, arrows}
\tikzstyle{startstop} = [circle, rounded corners,
minimum width=0.5cm, minimum height=0.25cm,text
centered, draw=black, fill=red!30]
\tikzstyle{io} = [trapezium, trapezium left angle=70,
trapezium right angle=110, minimum width=0.5cm, minimum
height=0.25cm, text centered, draw=black, fill=blue!30]
\tikzstyle{process} = [rectangle, minimum width=0.5cm,
minimum height=0.25cm, text centered,draw=black,
fill=orange!30]
\tikzstyle{decision} = [diamond, minimum width=0.5cm,
minimum height=0.1cm, text centered, draw=black,
fill=green!30]
\tikzstyle{arrow} = [thick,->,>=stealth]
```

```
\begin{figure}[!htbp]
\centering
\begin{tikzpicture}[node distance=1.0cm]
\small
\node (start) [startstop] {Start};
\node (in1) [io, below of=start, align=left,
yshift=-0.25cm] {Initialization};
\node (pro2) [draw, align=left,below
of=in1,yshift=0.1cm]{Objective Function Evaluation};
\node (pro3) [draw, align=left,below
of=pro2,yshift=0.1cm]{Elitism, Selection, Cross over,
mutation};
\node (dec1) [decision, align=left, below of=pro3,
yshift=-0.75cm] {Conv.\\ check};
\node (stop) [startstop, below of=dec1, yshift=-0.75cm]
{Stop};
```

```
\draw [arrow] (start) -- (in1);
\draw [arrow] (in1) -- (pro2);
\draw [arrow] (pro2) -- (pro3);
\draw [arrow] (pro3) -- (dec1);
\draw [arrow] (dec1) -- node[anchor=east] {Yes} (stop);
\draw [arrow] (dec1.west) -| ++(0cm,0cm)
node[anchor=north,pos=0.5] {No} -|
([xshift=-1.25cm]pro3.west) -- ++(1.25cm,0cm);
\end{tikzpicture}
\end{figure}
```



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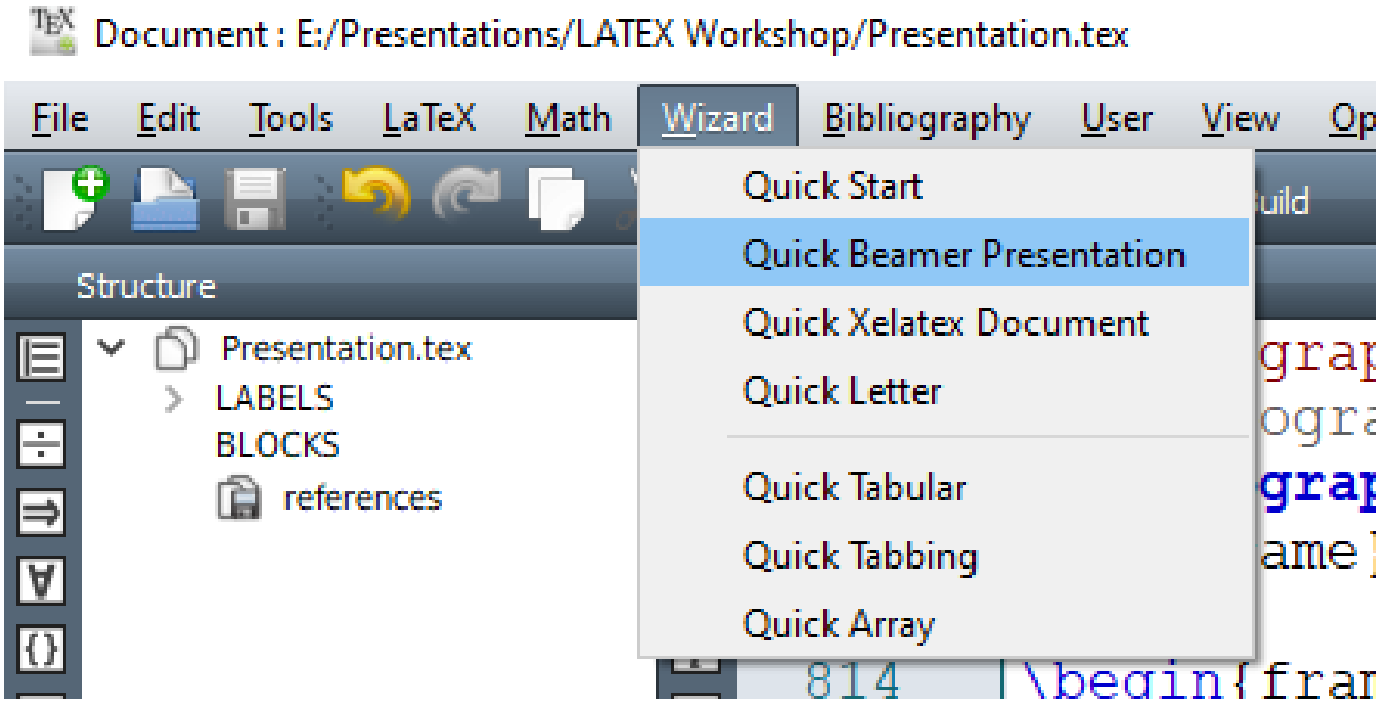

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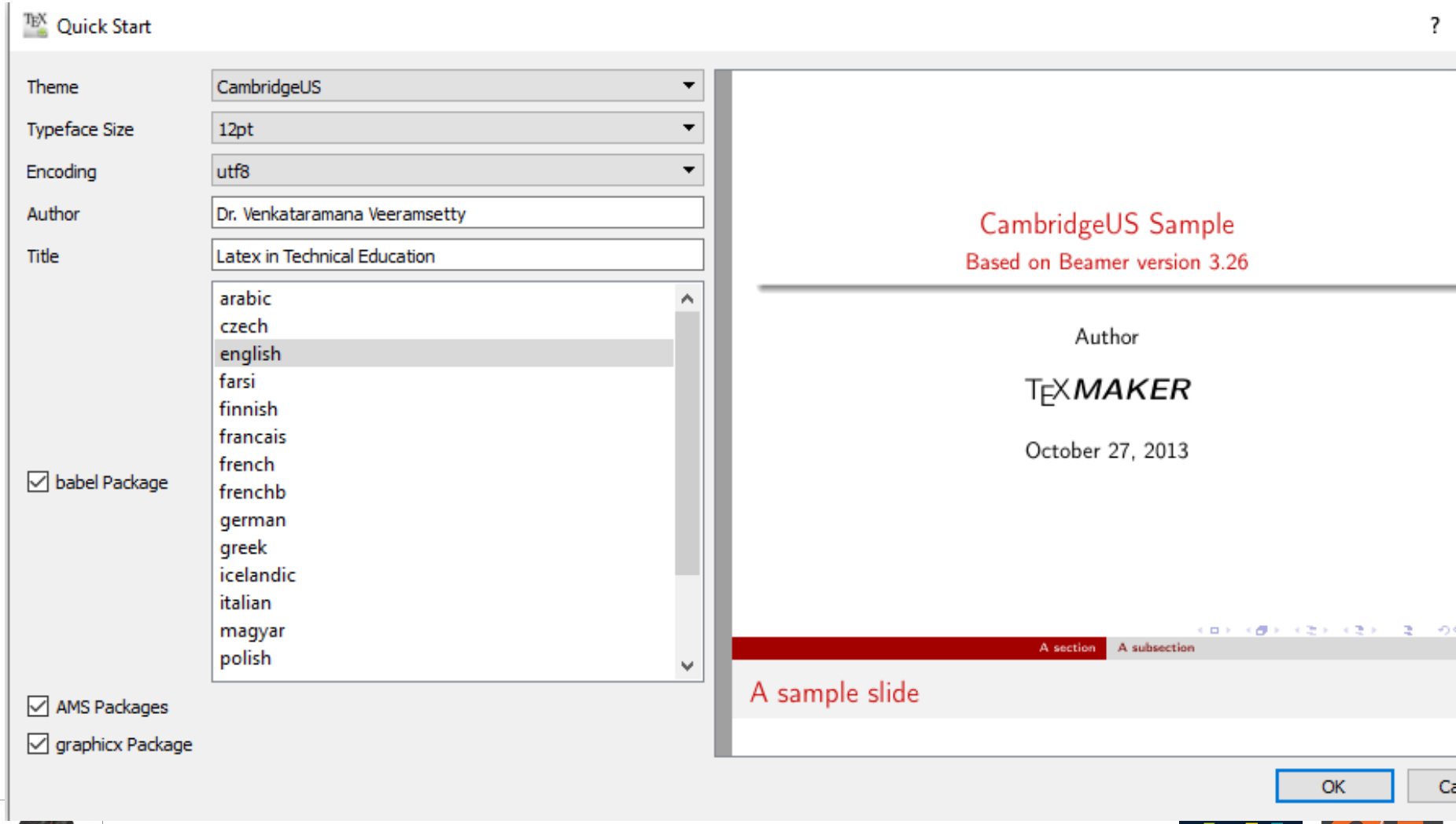
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\author{Dr. Venkataramana Veeramsetty}
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\institute{SR University}
\date{}
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\end{frame}
\begin{frame}
\tableofcontents
\end{frame}
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\end{document}
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Introduction

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References

- http://www.docs.is.ed.ac.uk/skills/documents/3722/3722-2014.pdf
- https://www.latex-tutorial.com/tutorials/
- https://en.wikibooks.org/wiki/LaTeX

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