链接：https://jiangwei99.github.io/LaTex_Blog/README.pdf

$LaTex$安装记录：https://jiangwei99.github.io/LaTex_Blog/Tex%E5%AE%89%E8%A3%85%E8%AE%B0%E5%BD%95/LaTex%E5%AE%89%E8%A3%85%E8%AE%B0%E5%BD%95.pdf

LaTex Blog

一、常用论文术语

```
i.e.
是“id est”的缩写，表示“that is; in other words; namely”，
用来进一步解释前面所说的观点，意思是“那就是说，换句话说”。
例句：There are three meals in the day (i.e., breakfast, lunch, and dinner).
```

```
e.g.
是“exempli gratia”的缩写，表示“for example; for instance; such as”，
用来引出若干例子来让前面说法更具体，更易理解，意思是“比如，例如”。
例句：I like sports, e.g., basketball and football.
```

```
iff
当且仅当
```

```
etc.
是“et cetera”的缩写，意思是“等等”，相当于“and so on”。
放在句子末尾，用来列举事物；若要列举人，则需用“et al. ”或“and others”。
例句：I need to go to the store and buy some pie, milk, cheese, etc.
```

```
a.k.a.
also known as的缩写。意思是亦称为。
```

```

```

```

```

二、图的插入

1.pdf格式的图片的插入

```
\begin{figure}[htb]
    \centering
    \includegraphics[keepaspectratio, width = 1\columnwidth]
{Figures/Horizontal Federated Learning.pdf}
    \caption{Horizontal Federated Learning
    \label{fig:Horizontal}}  %用于引用的标签
\end{figure}
```

效果:

paradigm moves the computation power closer to the devices generating the data.

Fig. 1. Horizontal Federated Learning.

Distributing computations over a number of servers at the edge of the wireless network leads to major challenges, among

[h] 表示的当前位置（here），也就是说图片排在你设置的当前位置，但是如果这一页的空间不足以放下这个图片，此时图片会转到下一页。

[t] 顶端(top)。此时系统会将图片放置在页面的顶部。

[b] 底部. (bottom) 这里是优先将图片放置在底部，也就是页面的底部。

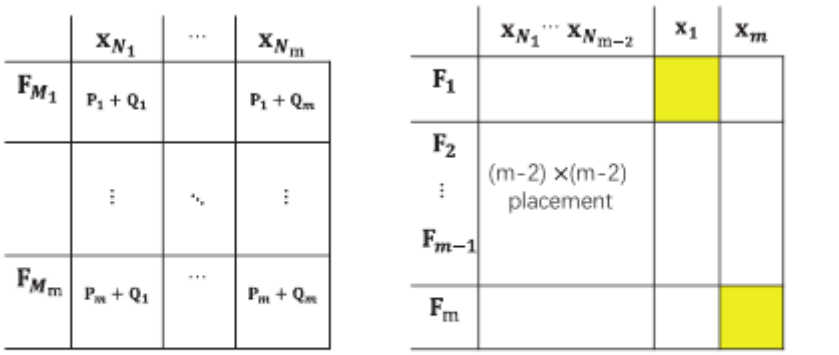
[p] 这个是将图片设置为浮动状态，也就是可以根据系统排版的，自动放置图片的位置。

2.eps格式的图片的插入

2.1两个图并排

```
 \begin{figure}[!ht]
    \centerline{$\begin{array}{cc}
        \includegraphics[width=1.4in]{unsecure1.eps} &
        \hspace{-1mm}\includegraphics[width=1.6in]{unsecure2.eps}\\
        \hspace{-1mm}\mbox{\footnotesize a)    general illustration of $
\textbf{E} $. } &
        \hspace{-1mm}\mbox{\footnotesize d)    optimal placement of
highlighted entries.} \\
        \end{array}$}\caption{Illustration
        of RPC.}  \label{fig.uns}
    \end{figure}
```

效果：



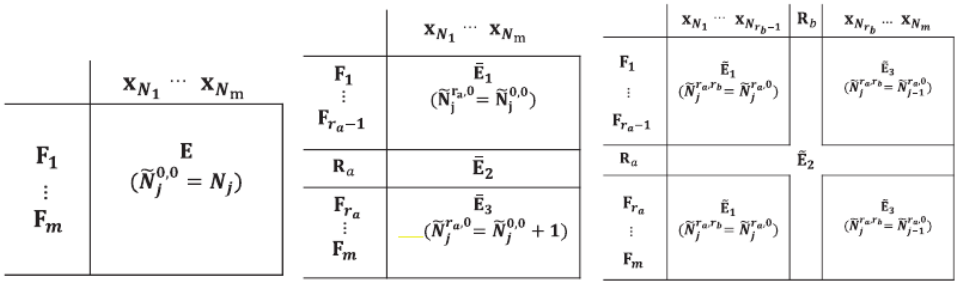
a) general illustration of **E**. d) optimal placement of highlighted entries.

Fig. 1. Illustration of RPC.

2.2三个图并排

```
 \begin{figure*}[!ht]
    \centerline{$\begin{array}{ccc}
        \includegraphics[width=2.0in]{secure1.eps} &
        \hspace{-1mm}\includegraphics[width=2.0in]{secure2.eps} &
        \hspace{-1mm}\includegraphics[width=2.5in]{secure3.eps}\\
        \hspace{-1mm}\mbox{\footnotesize a)   structure of
                $ \textbf{E} $. } &
        \hspace{-1mm}\mbox{\footnotesize b)   structure of
         $ \bar{\textbf{E}} $.} &
        \hspace{-1mm}\mbox{\footnotesize c)   structure of
         $ \tilde{\textbf{E}} $.} \\
        \end{array}$}\caption{The placements of highlighted entries in
SBMM.}  \label{fig.sbmm}
  \end{figure*}
```

效果：



a) structure of $\mathbf{E}$. b) structure of $\bar{\mathbf{E}}$. c) structure of $\tilde{\mathbf{E}}$.

Fig. 2. The placements of highlighted entries in SBMM.

2.3五个图并排

```
  \begin{figure*}[!ht]
    \centerline{$\begin{array}{ccccc}
        \includegraphics[width=1.3in]{ex1.eps} &
        \hspace{-1mm}\includegraphics[width=1.3in]{ex2.eps} &
        \hspace{-1mm}\includegraphics[width=1.3in]{ex3.eps} &
        \hspace{-1mm}\includegraphics[width=1.5in]{ex4.eps} &
        \hspace{-1mm}\includegraphics[width=1.5in]{ex5.eps}\\
        \hspace{-1mm}\mbox{\footnotesize a) $ r_a = 0, r_b =0 $.} &
        \hspace{-1mm}\mbox{\footnotesize b) $ r_a = 2, r_b =0 $.}&
        \hspace{-1mm}\mbox{\footnotesize c) $ r_a = 3, r_b =0 $.}&
        \hspace{-1mm}\mbox{\footnotesize d) $ r_a = 3, r_b =5 $.} &
        \hspace{-1mm}\mbox{\footnotesize e) $ r_a = 3, r_b =4 $.} \\
        \end{array}$}\caption{Examples of the placement of highlighted
entries.}  \label{fig.ex}
  \end{figure*}
```

效果：

Fig. 2. The placements of highlighted entries in SBMM.

	x_2	x_3	x_1	x_4
F_1	0	2	6	7
F_2	1	3	7	8
F_3	2	4	8	9
F_4	3	5	9	10

a) $r_a = 0, r_b = 0$.

	x_2	x_3	x_1	x_4
F_1	0	3	8	9
R_A	1	4	9	10
F_2	2	5	10	11
F_3	3	6	11	12
F_4	4	7	12	13

b) $r_a = 2, r_b = 0$.

	x_2	x_3	x_1	x_4
F_1	0	2	7	8
F_2	1	3	8	9
R_A	2	4	9	10
F_3	3	5	10	11
F_4	4	6	11	12

c) $r_a = 3, r_b = 0$.

	x_2	x_3	x_1	x_4	R_B
F_1	0	2	7	8	13
F_2	1	3	8	9	14
R_A	2	4	9	10	15
F_3	3	5	10	11	16
F_4	4	6	11	12	17

d) $r_a = 3, r_b = 5$.

	x_2	x_3	x_1	R_B	x_4
F_1	0	2	7	8	9
F_2	1	3	8	9	10
R_A	2	4	9	10	11
F_3	3	5	10	11	12
F_4	4	6	11	12	13

e) $r_a = 3, r_b = 4$.

Fig. 3. Examples of the placement of highlighted entries.

3.图片按比例缩放

```
\includegraphics[width=3.3in]{t1.eps}
```

控制宽度，单位可选in/cm（英寸/厘米）长度按比例缩放

4.pdf格式转为eps格式

pdf2eps-githublink

pdf2eps md

三、表的插入

四、数学符号（公式）

ℓ `\ell`

$\mathcal{L}$ `\mathcal L`

$\mathcal{N}$ `$\mathcal N$` `${\cal N}$`

$\mathbb{F}$ `$\mathbb{F}$` 空心字母

$\binom{k'}{k}$ `{k'}\choose{k}` 阶乘符号

1.逗号不应放进公式里面

```
$\alpha, \beta, k'$
应为
$\alpha$, $\beta$, $k'$
```

α, β, k'
应为
α, β, k'
$符号里的空格会被忽略。
所以生成的pdf里，没有空格

2.空格表示方法

详情	代码	样式	备注
两个quad空格	a \qquad b	$a \qquad b$	两个m的宽度
quad空格	a \quad b	$a \quad b$	一个m的宽度
大空格	a\ b	$a\ b$	1/3m宽度
中等空格	a\;b	$a\;b$	2/7m*宽度
小空格	a\,b	$a\,b$	1/6m宽度
没有空格	ab	ab	
紧贴	a!b	$a!b$	缩进1/6m宽度

五、算法块

算法块需要调用包

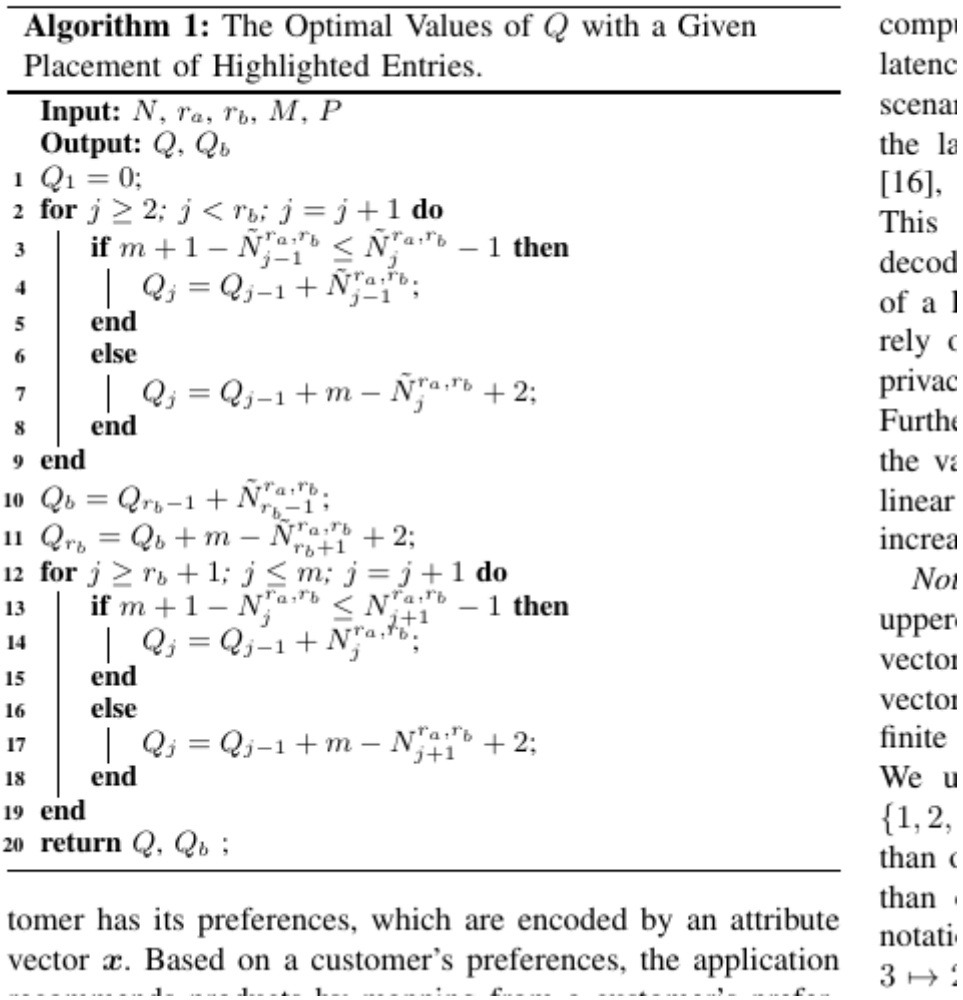
```
\usepackage[ruled,linesnumbered]{algorithm2e}
```

1.（英文）算法块的插入

```
\begin{algorithm}\label{alg1}
    \LinesNumbered
    \begin{small}
        \KwIn{$ N $, $ r_a $, $ r_b $, $ M $, $ P $}
        \KwOut{$ Q $, $ Q_b $}
        $ Q_1 = 0 $;\\
        \For{$ j \ge 2 $; $j < r_b $; $j=j+1$}{
            \If {$ m+1 - \tilde{N}_{j-1}^{r_a,r_b}  \le \tilde{N}_{j}^{r_a,r_b}-1 $}{
                $ Q_j = Q_{j-1} + \tilde{N}_{j-1}^{r_a,r_b} $;\\
            }
            \Else
            { $ Q_j = Q_{j-1} +m - \tilde{N}_{j}^{r_a,r_b}+2 $;\\}
        }
        $ Q_{b} = Q_{r_b - 1} + \tilde{N}_{r_b-1}^{r_a,r_b} $;\\
        $ Q_{r_b} = Q_{b} +m - \tilde{N}_{r_b+1}^{r_a,r_b}+2 $;\\
        \For {$ j \ge r_b + 1 $; $ j \le m $; $ j=j+1 $ }{
            \If {$ m+1 - N_{j}^{r_a,r_b}  \le N_{j+1}^{r_a,r_b}-1 $}{
                $ Q_j = Q_{j-1} + N_{j}^{r_a,r_b} $;\\
            }
            \Else
            { $Q_j = Q_{j-1} +m - N_{j+1}^{r_a,r_b}+2 $;\\}
        }

        \Return  $ Q $, $ Q_b $ ;
        \caption{The Optimal Values of $ Q $ with a Given Placement of Highlighted Entries.} \label{optimal}
    \end{small}
\end{algorithm}
```

效果:



Algorithm 1: The Optimal Values of Q with a Given Placement of Highlighted Entries.

Input: N, r_a, r_b, M, P
Output: Q, Q_b

$Q_1 = 0$;
for $j \geq 2$; $j < r_b$; $j = j + 1$ **do**
  if $m + 1 - \tilde{N}_{j-1}^{r_a,r_b} \leq \tilde{N}_j^{r_a,r_b} - 1$ **then**
    $Q_j = Q_{j-1} + \tilde{N}_{j-1}^{r_a,r_b}$;
  end
  else
    $Q_j = Q_{j-1} + m - \tilde{N}_j^{r_a,r_b} + 2$;
  end
end
$Q_b = Q_{r_b-1} + \tilde{N}_{r_b-1}^{r_a,r_b}$;
$Q_{r_b} = Q_b + m - \tilde{N}_{r_b+1}^{r_a,r_b} + 2$;
for $j \geq r_b + 1$; $j \leq m$; $j = j + 1$ **do**
  if $m + 1 - N_j^{r_a,r_b} \leq N_{j+1}^{r_a,r_b} - 1$ **then**
    $Q_j = Q_{j-1} + N_j^{r_a,r_b}$;
  end
  else
    $Q_j = Q_{j-1} + m - N_{j+1}^{r_a,r_b} + 2$;
  end
end
return Q, Q_b ;

tomer has its preferences, which are encoded by an attribute vector $\boldsymbol{x}$. Based on a customer's preferences, the application

2.（中文）算法块的插入

```
\begin{algorithm}[H]
 \setstretch{1.1}
 \SetAlgoLined
 \LinesNumbered
 %   \begin{small}
 \KwIn{任务集合~$\mathcal{S}$, 任务信息~$\textbf{$\pi$}$, 时隙~$t$~的~CAP~任务队列~$\mathcal{Q}(t)$ ,时隙~$t$~的卸载策略~$\textbf{x}(t)$}%
 \KwOut{更新的任务集合~$\mathcal{S}^\prime$}%
 \eIf {$t=1$}{
  $\mathcal{S}(1) \longleftarrow \varnothing$\;
  \While{$i \leq M$}{
   $\mathcal{S}(1) \longleftarrow \mathcal{S}(1)\cup \{\pi _{1,i}\}$\;
   根据等式~(4.7)~计算时延\;
   $l_{i}(1) \longleftarrow \lceil l_{i}(1) \rceil$\;
   $\mathcal{S}(1+l_{i}(1))\longleftarrow \mathcal{S}(1+l_{i}(1))\cup \{\pi _{1,i}\}$\;
 }} {
  \uIf {$\mathcal{S}(t) = \varnothing $} {
   break\;
  }
  \ElseIf {$\mathcal{S}(t) \neq \varnothing $} {
   $s(t) \longleftarrow |\mathcal{S}(t)| $\;
```

```
    \While{$i \leq s(t)$}{
     根据~$l_{1,i}$~确定任务信息~$\pi _{m,n}$\;
     计算时延~$l_{i}(t)$\;
     $l_{i}(t) \longleftarrow \lceil l_{i}(t) \rceil$\;
     $\mathcal{S}(t+l_{i}(t))\longleftarrow \mathcal{S}(t+l_{i}(t))\cup \{\pi
_{m+1,n}\}$\;
    }
   }
  }
  \Return  $\mathcal{S}^\prime$\;
  \caption{任务集合更新算法\label{alg42}}
  %   \end{small}
\end{algorithm}
```

六、参考文献系列

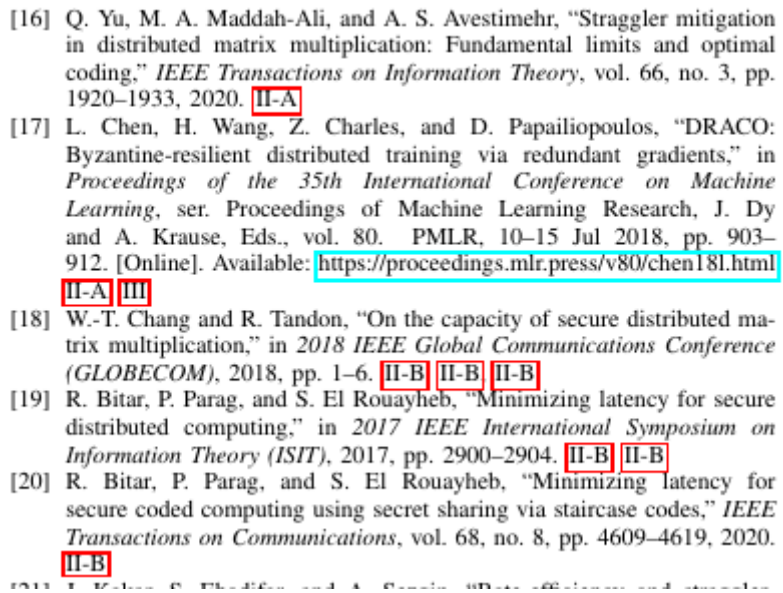
1.正文中[引用]高亮显示+超链接

```
\usepackage[backref]{hyperref}    %用于引用突出，会报错，但能编译
```

效果如图

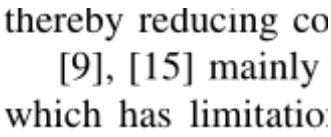
B. Coded Computing

There are two main challenges in distributed computing: How to reduce communication overhead and ensure safety. In order to calculate the final result, a large number of intermediate results need to be exchanged between computing nodes through the network. This not only increases communication overhead, but also limits the performance of distributed computing applications. For example, for the Hadoop cluster on Facebook, the average time spent in the data transfer phase accounts for 33% of the entire job execution time [4]. When running the Terasort application on a heterogeneous Amazon EC2 cluster, data shuffling will take 65% of the time. Approximately 70% of the total execution time is spent on the Self-Join application [5]. In the actual training of convolutional neural networks, communication restrictions are even more embarrassing. As we all know, millions of model parameters need to be updated in ResNet-50 [6] and AlexNet [7].


[16] Q. Yu, M. A. Maddah-Ali, and A. S. Avestimehr, "Straggler mitigation in distributed matrix multiplication: Fundamental limits and optimal coding," *IEEE Transactions on Information Theory*, vol. 66, no. 3, pp. 1920–1933, 2020. II-A
[17] L. Chen, H. Wang, Z. Charles, and D. Papailiopoulos, "DRACO: Byzantine-resilient distributed training via redundant gradients," in *Proceedings of the 35th International Conference on Machine Learning*, ser. Proceedings of Machine Learning Research, J. Dy and A. Krause, Eds., vol. 80. PMLR, 10–15 Jul 2018, pp. 903–912. [Online]. Available: https://proceedings.mlr.press/v80/chen18l.html II-A III
[18] W.-T. Chang and R. Tandon, "On the capacity of secure distributed matrix multiplication," in *2018 IEEE Global Communications Conference (GLOBECOM)*, 2018, pp. 1–6. II-B II-B II-B
[19] R. Bitar, P. Parag, and S. El Rouayheb, "Minimizing latency for secure distributed computing," in *2017 IEEE International Symposium on Information Theory (ISIT)*, 2017, pp. 2900–2904. II-B II-B
[20] R. Bitar, P. Parag, and S. El Rouayheb, "Minimizing latency for secure coded computing using secret sharing via staircase codes," *IEEE Transactions on Communications*, vol. 68, no. 8, pp. 4609–4619, 2020. II-B

2.引用文献在正文中的显示

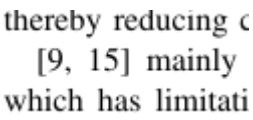
参考文献引用出现这种情况：



导入包：

```
\usepackage[numbers,sort&compress]{natbib} %用于解决[9],[15]，把变成[9,15]
```

效果如下：



七、引用

1.使用newcommand实现文中图片公式及\label引用

在引用图片公式或者section时总是手动输入Fig.?，Equation.?和Section.?很浪费时间。
解决方案：使用\newcommand{}自定义引用格式。

```
...
%% for references
\newcommand{\secref}[1]{Sec.~\ref{#1}}
\newcommand{\appref}[1]{\textit{Appendix}~\ref{#1}}
\newcommand{\algref}[1]{Algorithm~\ref{#1}}
\newcommand{\figref}[1]{Fig.~\ref{#1}}
\newcommand{\tabref}[1]{Table~\ref{#1}}
\newcommand{\ttref}[1]{Theorem~\ref{#1}}
\newcommand{\llref}[1]{Lemma~\ref{#1}}
\newcommand{\ccref}[1]{Corollary~\ref{#1}}
\newcommand{\ddref}[1]{Definition~\ref{#1}}
\newcommand{\equref}[1]{Eq.~(\ref{#1})}
```

```
\newcommand{\ineqref}[1]{Ineq.~(\ref{#1})}
\renewcommand{\thefootnote}{\fnsymbol{footnote}}
...
\begin{document}
...

```

```
\section{Conclusion}
\label{sec.con}
```

文末的定位标签，前文可以引用

`we conclude the paper in \secref{sec.con}.`

八、正文

1.定义、定理

使用宏包并依次定义

```
\usepackage{amsthm}
\newtheorem{example}{Example}
\newtheorem{lemma}{Lemma}
\newtheorem{theorem}{Theorem}
\newtheorem{cor}{Corollary}
\newtheorem{pro}{Proposition}
\newtheorem{definition}{Definition}
\newtheorem{rem}{Remark}
```

正文中：

```
\begin{definition}
    Consider
\end{definition}
```

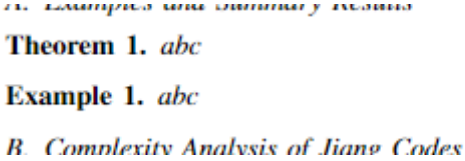
```
\begin{theorem}
abc
\end{theorem}

\begin{example}
abc
\end{example}
```

效果：

- verification sever

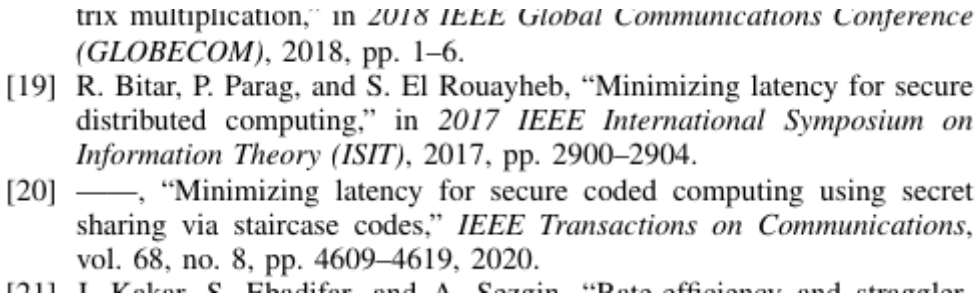
Definition 1. *Consider*



2.文字变红

附录：出现的问题及解决方案

1.参考文献中人名出现横线


trix multiplication," in *2018 IEEE Global Communications Conference (GLOBECOM)*, 2018, pp. 1–6.
[19] R. Bitar, P. Parag, and S. El Rouayheb, "Minimizing latency for secure distributed computing," in *2017 IEEE International Symposium on Information Theory (ISIT)*, 2017, pp. 2900–2904.
[20] ——, "Minimizing latency for secure coded computing using secret sharing via staircase codes," *IEEE Transactions on Communications*, vol. 68, no. 8, pp. 4609–4619, 2020.
[21] J. Kakar, S. Ebadifar, and A. Sezgin, "Rate-efficiency and straggler-

原因：这是因为相邻两篇文献的作者相同，在IEEE模板下会出现横线。

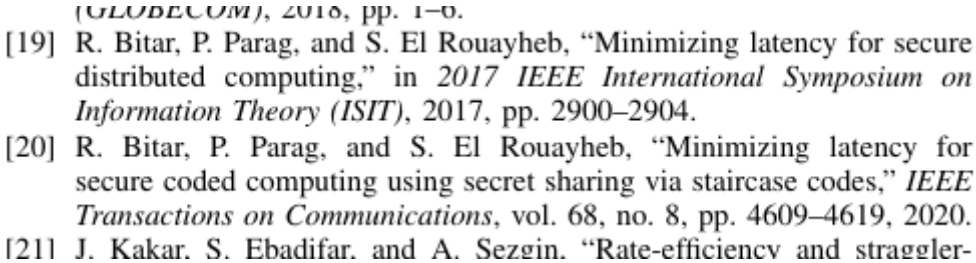
找到TexLive安装目录下的**"IEEEtran.bst"**文件

```
路径：D:\Program Files\TexLive\2021\texmf-dist\bibtex\bst\IEEEtran.bst
```

找到如下代码(大约在128行)，将代码中的#1**变为**#0

```
FUNCTION {default.is.dash.repeated.names} { #1 }
```

重新编译，解决问题


(GLOBECOM), 2018, pp. 1–6.
[19] R. Bitar, P. Parag, and S. El Rouayheb, "Minimizing latency for secure distributed computing," in *2017 IEEE International Symposium on Information Theory (ISIT)*, 2017, pp. 2900–2904.
[20] R. Bitar, P. Parag, and S. El Rouayheb, "Minimizing latency for secure coded computing using secret sharing via staircase codes," *IEEE Transactions on Communications*, vol. 68, no. 8, pp. 4609–4619, 2020.
[21] J. Kakar, S. Ebadifar, and A. Sezgin, "Rate-efficiency and straggler-