

# Quick start for LaTeXing with IEEEtran.cls for IEEE Computer Society Conferences

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**Abstract**—Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

## I. INTRODUCTION

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus

viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus enim. Vestibulum pellentesque felis eu massa. **TODO!**

The remainder of the paper starts with a presentation of related work (Section II). It is followed by a presentation of hints on L<sup>A</sup>T<sub>E</sub>X (Section III). Finally, a conclusion is drawn and outlook on future work is made (Section IV).

## II. RELATED WORK

Winery [1] is a graphical modeling tool. The whole idea of TOSCA is explained by Binz et al. [2].

## III. L<sup>A</sup>T<sub>E</sub>X HINTS

This section contains hints on writing L<sup>A</sup>T<sub>E</sub>X. It focuses on minimal examples, which can be directly adapted to the content

### A. Handling of paragraphs

One sentence per line. This rule is important for the usage of version control systems. A new line is generated with a blank line. As you would do in Word: New paragraphs are generated by pressing enter. In L<sup>A</sup>T<sub>E</sub>X, this does not lead to a new paragraph as L<sup>A</sup>T<sub>E</sub>X joins subsequent lines. In case you want a new paragraph, just press enter twice! This leads to an empty line. In word, there is the functionality to press shift and enter. This leads to a hard line break. The text starts at the beginning of a new line. In L<sup>A</sup>T<sub>E</sub>X, you can do that by using two backslashes (\\). This is rarely used.

Please do *not* use two backslashes for new paragraphs. For instance, this sentence belongs to the same paragraph, whereas the last one started a new one. A long motivation for that is provided at <http://loopspace.mathforge.org/HowDidIDoThat/TeX/VCS/#section.3>.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
579 %EÜÖÜ
580 One sentence per line.
581 This rule is important for the usage of version
    control systems.
582 A new line is generated with a blank line.
583 As you would do in Word:
584 New paragraphs are generated by pressing enter.
585 In LaTeX, this does not lead to a new paragraph
    as LaTeX joins subsequent lines.
586 In case you want a new paragraph, just press
    enter twice!
587 This leads to an empty line.
588 In word, there is the functionality to press
    shift and enter.
589 This leads to a hard line break.
590 The text starts at the beginning of a new line.
591 In LaTeX, you can do that by using two
    backslashes (\textbackslash\textbackslash).
592 \\
593 This is rarely used.
594
595 Please do \textit{not} use two backslashes for
    new paragraphs.
596 For instance, this sentence belongs to the same
    paragraph, whereas the last one started a
    new one.
597 A long motivation for that is provided at
    \url{http://loopspace.mathforge.org/HowDidIDoThat/T
```

#### B. Notes separated from the text

The package mindflow enables writing down notes and annotations in a way so that they are separated from the main text.

---

This is a small note.

---

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
604 %EÜÖÜ
605 \begin{mindflow}
606 This is a small note.
607 \end{mindflow}
```

#### C. Handling TODOs

Markierter Text.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
612 %EÜÖÜ
613 \textmarker{Markierter Text.}
```

Bei `\textmarker` wird nur die Textfarbe geändert, da dies auch bei einigen Worten gut funktioniert.

Markierter Text.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
618 %EÜÖÜ
619 \textcomment{Markierter Text.}{Kommentar dazu.}
```

Manuelle Markierung für Text, der seit der letzten Version geändert wurde.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
622 %EÜÖÜ
623 \modified{Manuelle Markierung für Text, der seit
    der letzten Version geändert wurde.}
```

Das ist ein Text. Geänderter Text.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
626 %EÜÖÜ
627 Das ist ein Text.
628 \change{FL1: Text angepasst}{Geänderter Text}.
```

Hier nur ein Kommentar.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
631 %EÜÖÜ
632 Hier nur ein Kommentar\sidecomment{Kommentar}.
```

TODO!

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
635 %EÜÖÜ
636 \todo{Hier muss noch kräftig Text produziert
    werden}
```

#### D. Hyphenation

L<sup>A</sup>T<sub>E</sub>X automatically hyphenates words. When using microtype, there should be fewer hyphenations than in other settings. It might be necessary to tweak the hyphenations nevertheless. Here are some hints:

In case you write “application-specific”, then the word will only be hyphenated at the dash. You can also write `applica\allowbreak{tion-specific}` (result: application-specific), but this is much more effort.

You can now write words containing hyphens which are hyphenated at other places in the word. For instance, `application"=specific` gets application"=specific. This is enabled by an additional configuration of the babel package.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

646 %EÜÜö
647 In case you write
      \enquote{application-specific}, then the
      word will only be hyphenated at the dash.
648 You can also write
      \verb!applica\allowbreak{}tion-specific!
      (result:
      applica\allowbreak{}tion-specific), but
      this is much more effort.
649
650 You can now write words containing hyphens which
      are hyphenated at other places in the word.
651 For instance, \verb!application="specific! gets
      application="specific.
652 This is enabled by an additional configuration
      of the babel package.

```

#### E. Typesetting Units

Numbers can be written plain text (such as 100), by using the siunitx package as follows:  $100 \frac{\text{km}}{\text{h}}$ , or by using plain L<sup>A</sup>T<sub>E</sub>X (and math mode):  $100 \frac{\text{km}}{\text{h}}$ .

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

657 %EÜÜö
658 Numbers can be written plain text (such as 100),
      by using the
      \href{https://ctan.org/pkg/siunitx}{siunitx}
      package as follows:
659 \SI{100}{\km\per\hour},
660 or by using plain \LaTeX{} (and math mode):
661 $\SI{100}{\frac{\mathit{km}}{h}}$.

```

5 % of 10 kg

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

664 %EÜÜö
665 \SI{5}{\percent} of \SI{10}{kg}

```

Numbers are automatically grouped: 123 456.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

668 %EÜÜö
669 Numbers are automatically grouped: \num{123456}.

```

#### F. Surrounding Text by Quotes

Please use the “enquote command” to quote something. Quoting with “quote” or “quote” also works.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

674 %EÜÜö
675 Please use the \enquote{enquote command} to
      quote something.
676 Quoting with "``quote" or ``quote" also works.

```

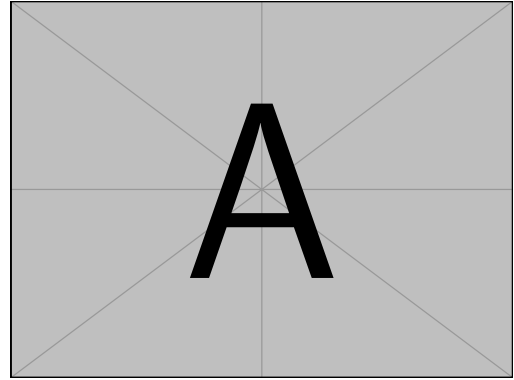


Figure 1. Example figure for cref demo

Heading1	Heading2
One	Two
Thee	Four

Figure 2. Example table for cref demo

#### G. Cleveref examples

Cleveref demonstration: Cref at beginning of sentence, cref in all other cases.

Figure 1 shows a simple fact, although Figure 1 could also show something else.

Figure 2 shows a simple fact, although Figure 2 could also show something else.

Section III-G shows a simple fact, although Section III-G could also show something else.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

706 %EÜÜö
707 \Cref{fig:ex:cref} shows a simple fact, although
      \cref{fig:ex:cref} could also show
      something else.
708
709 \Cref{tab:ex:cref} shows a simple fact, although
      \cref{tab:ex:cref} could also show
      something else.
710
711 \Cref{sec:ex:cref} shows a simple fact, although
      \cref{sec:ex:cref} could also show
      something else.

```

#### H. Figures

Figure 3 shows something interesting.

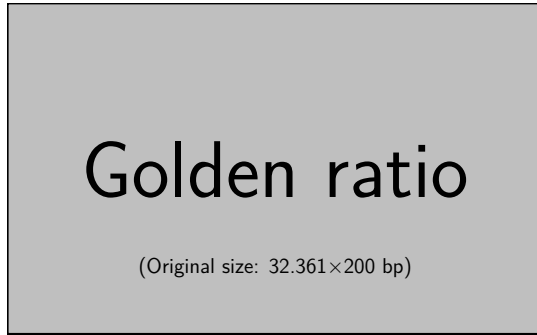


Figure 3. Simple Figure. Based on Scharrer [3].

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

716 %\caption{Golden ratio}
717 \Cref{fig:label} shows something interesting.
718
719 \begin{figure}
720   \centering
721   \includegraphics[width=.8\linewidth]{example-image-golden}
722   \caption[Simple Figure]{
723     Simple Figure.
724     Based on \citet{mwe}.
725   }
726   \label{fig:label}
727 \end{figure}

```

One can span a figure across multiple columns by using `\begin{figure*}`. See Figure 4 as an example.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

733 %\caption{Golden ratio}
734 \begin{figure*}
735   \centering
736   % note that \textwidth is used instead of
737   % \linewidth
737   % This ensures that the graphics width is 60%
737   % of the "page" (text block), and not just
737   % 60% of the current text column
738   % See
738   % https://tex.stackexchange.com/a/17085/9075
738   % for details
739   \includegraphics[width=.6\textwidth]{example-image-16x9}
740   \caption{16x9 Figure}
741   \label{fig:16x9}
742 \end{figure*}

```

### I. Sub Figures

An example of two sub figures is shown in Figure 5.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

750 %\caption{Golden ratio}
751 \begin{figure*}[!b]
752   \centering
753   \subfloat[Case I]{\includegraphics[width=.4\linewidth]{example-image-a}}
754   \label{fig:first_case}}
755   \hfil
756   \subfloat[Case II]{\includegraphics[width=.4\linewidth]{example-image-b}}
757   \label{fig:second_case}}
758   \caption{Example figure with two sub figures.}
759   \label{fig:two_sub_figures}
760 \end{figure*}

```

Note that often IEEE papers with subfigures do not employ subfigure captions (using the optional argument to `\subfloat[]`), but instead will reference/describe all of them (a), (b), etc., within the main caption. Be aware that for `subfig.sty` to generate the (a), (b), etc., subfigure labels, the optional argument to `\subfloat` must be present. If a subcaption is not desired, just leave its contents blank, e.g., `\subfloat[]`. An example is shown in Figure 6.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

772 %\caption{Golden ratio}
773 \begin{figure*}[!b]
774   \centering
775   \subfloat[]{\includegraphics[width=.4\linewidth]{example-image-a}}
776   \label{fig:first_case_ieee}}
777   \hfil
778   \subfloat[]{\includegraphics[width=.4\linewidth]{example-image-b}}
779   \label{fig:second_case_ieee}}
780   \caption{Example figure with two sub figures.
780     IEEE style. (a) The first case. (b) The
780     second case.}
781   \label{fig:two_sub_figures_ieee}
782 \end{figure*}

```

### J. Tables

Note that IEEE does not support `\begin{table}`, one has to use `\begin{figure}`.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

789 %\caption{Golden ratio}
790 \begin{figure}
791   \caption{Simple Table}
792   \label{tab:simple}
793   \centering
794   \begin{tabular}{ll}
795     \toprule
796     Heading1 & Heading2 \\
797     \midrule
798     One      & Two      \\
799     Three    & Four     \\
800     \bottomrule
801   \end{tabular}
802 \end{figure}

```

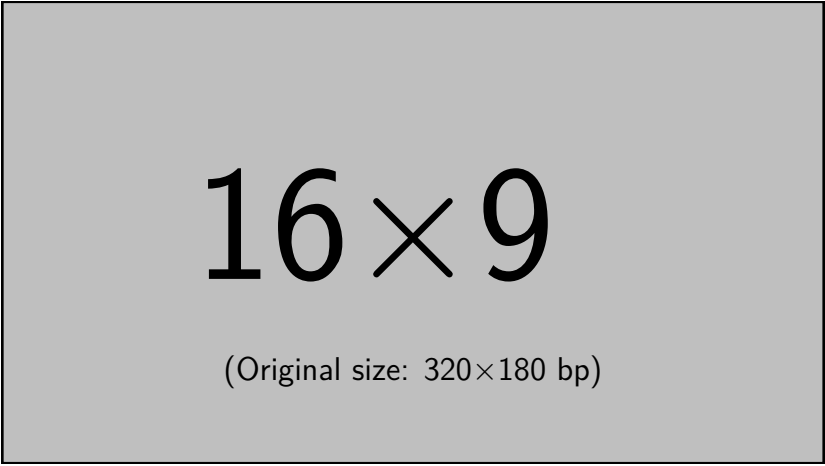
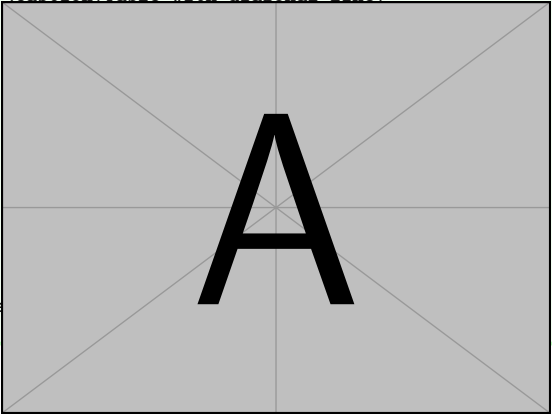


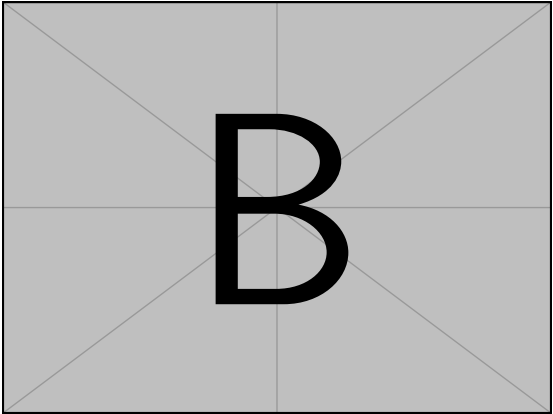
Figure 4. 16x9 Figure

Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
805 æFüÜöŦ
806 % Source:
      https://tex.stackexchange.com/a/468994/9075
807 \begin{figure}
808   \caption{Table with diagonal line}
809
810
811
812
813
814
815
816
817
818
819 \end{figure}
```

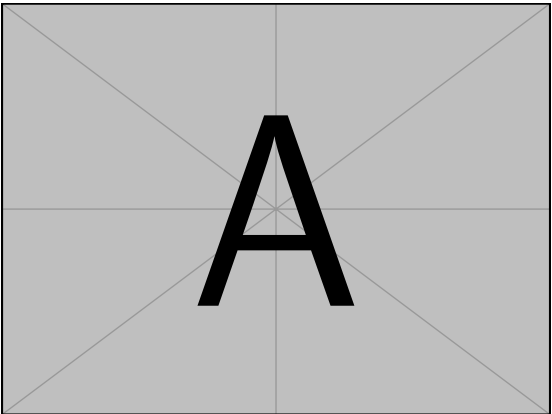


(a) Case I

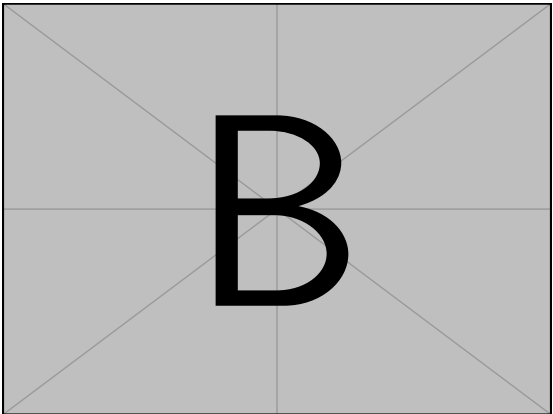


(b) Case II

Figure 5. Example figure with two sub figures.



(a)



(b)

Figure 6. Example figure with two sub figures. IEEE style. (a) The first case. (b) The second case.

Figure 7. Simple Table	
Heading1	Heading2
One	Two
Thee	Four

Figure 8. Table with diagonal line		
Diag Column Head I	Diag Column Head II	Second
		Third
		foo
		bar

### K. Source Code

Listing 1 shows source code written in XML. Listing 1 contains a comment.

```

1 <listing name="example">
2   <!-- comment -->
3   <content>not interesting</content>
4 </listing>
```

Listing 1. Example XML Listing

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

825 %\begin{lstlisting}
826 \Cref{lst:XML} shows source code written in XML.
827 \Cref{line:comment} contains a comment.
828
829 \begin{lstlisting}[
830   language=XML,
831   caption={Example XML Listing},
832   label={lst:XML}]
833 <listing name="example">
834   <!-- comment --> (* \label{line:comment} *)
835   <content>not interesting</content>
836 </listing>
837 \end{lstlisting}
```

One can also add `float` as parameter to have the listing floating. Listing 2 shows the floating listing.

```

1 <listing name="example">
2   Floating
3 </listing>
```

Listing 2. Example XML listing – placed as floating figure

```

1 {
2   key: "value"
3 }
```

Listing 3. Example JSON listing – placed as floating figure

```

1 public class Hello {
2   public static void main (String[] args) {
3     System.out.println("Hello World!");
4   }
5 }
```

Listing 4. Example Java listing

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

843 %\begin{lstlisting}
844 \begin{lstlisting}[
845   % one can adjust spacing here if required
846   % aboveskip=2.5\baselineskip,
847   % belowskip=-.8\baselineskip,
848   float,
849   language=XML,
850   caption={Example XML listing -- placed as
851     floating figure},
851   label={lst:flXML}]
852 <listing name="example">
853   Floating
854 </listing>
855 \end{lstlisting}
```

One can also typeset JSON as shown in Listing 3.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

860 %\begin{lstlisting}
861 \begin{lstlisting}[
862   float,
863   language=json,
864   caption={Example JSON listing -- placed as
865     floating figure},
865   label={lst:json}]
866 {
867   key: "value"
868 }
869 \end{lstlisting}
```

Java is also possible as shown in Listing 4.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```

874 %\begin{lstlisting}
875 \begin{lstlisting}[
876   caption={Example Java listing},
877   label=lst:java,
878   language=Java,
879   float]
880 public class Hello {
881   public static void main (String[] args) {
882     System.out.println("Hello World!");
883   }
884 }
885 \end{lstlisting}
```

### L. Itemization

One can list items as follows:

- Item One
- Item Two

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
892 %\u0000
893 \begin{itemize}
894   \item Item One
895   \item Item Two
896 \end{itemize}
```

With the package paralist, one can create itemizations with lesser spacing:

- Item One
- Item Two

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
901 %\u0000
902 \begin{compactitem}
903   \item Item One
904   \item Item Two
905 \end{compactitem}
```

One can enumerate items as follows:

- 1) Item One
- 2) Item Two

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
910 %\u0000
911 \begin{enumerate}
912   \item Item One
913   \item Item Two
914 \end{enumerate}
```

With the package paralist, one can create enumerations with lesser spacing:

- 1) Item One
- 2) Item Two

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
919 %\u0000
920 \begin{compactenum}
921   \item Item One
922   \item Item Two
923 \end{compactenum}
```

With paralist, one can even have all items typeset after each other and have them clean in the TeX document:

- 1) All these items... 2) ...appear in one line 3) This is enabled by the paralist package.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
928 %\u0000
929 \begin{inparaenum}
930   \item All these items...
931   \item ...appear in one line
932   \item This is enabled by the paralist package.
933 \end{inparaenum}
```

### M. Other Features

The words “workflow” and “dwarflike” can be copied from the PDF and pasted to a text file.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
938 %\u0000
939 The words \enquote{workflow} and
      \enquote{dwarflike} can be copied from the
      PDF and pasted to a text file.
```

The symbol for powerset is now correct:  $\wp$  and not a Weierstrass p ( $\wp$ ).

$\wp(1,2,3)$

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
942 %\u0000
943 The symbol for powerset is now correct:
      $\powerset$ and not a Weierstrass p ($\wp$).
944
945 $\powerset(\{1,2,3\})$
```

Brackets work as designed: <test> One can also input backticks in verbatim text: ``test``.

#### Corresponding L<sup>A</sup>T<sub>E</sub>X code of ./paper.tex

```
948 %\u0000
949 Brackets work as designed:
950 <test>
951 One can also input backticks in verbatim text:
      \verb|`test`|.
```

## IV. CONCLUSION AND OUTLOOK

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

#### ACKNOWLEDGMENT

Identification of funding sources and other support, and thanks to individuals and groups that assisted in the research and the preparation of the work should be included in an acknowledgment section, which is placed just before the reference section in your document [4].

In the bibliography, use `\textsuperscript` for “st”, “nd”, ...: E.g., “The 2<sup>nd</sup> conference on examples”. When you use JabRef, you can use the clean up command to achieve that. See <https://help.jabref.org/en/CleanupEntries> for an overview of the cleanup functionality.

#### REFERENCES

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All links were last followed on October 5, 2020.