

LIPE Guide on Writing in Academia*

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Academic writing is a very important skill and, unfortunately, a difficult one to master. Here are some tips; please follow them religiously to avoid unnecessary back and forth. If you see something mentioned here, it's because I have seen it far too many times, even though you may think it's trivial. My experience shows that more than half of my editorial comments are already mentioned in this guide. Therefore, please do not overlook this list. added in fall '17: **The most recent edits are highlighted.**

I IEEE Style

1. We follow the IEEE style guide. *Please read the following documents before you start writing your paper/report and keep them as reference:* The vast majority of mistakes in writing are because of not confirming to these style guides.
 - <http://www.ieee.org/documents/stylemanual.pdf>
 - http://www.ieee.org/documents/transactions_journals.pdf
 - IEEE L^AT_EX Guide: http://mirrors.ctan.org/macros/latex/contrib/IEEEtran/IEEEtran_HOWTO.pdf
 - IEEE BibT_EX Guide: http://mirrors.ctan.org/macros/latex/contrib/IEEEtran/bibtex/IEEEtran_bst_HOWTO.pdf
 - IEEE T_EX template files: <http://www.ctan.org/tex-archive/macros/latex2e/contrib/IEEEtran>

For details, use Chicago Manual of Style (CMOS), which is a prominent style guide for American English. WSU has an online subscription to CMOS. IEEE uses Chicago. Chicago uses Merriam-Webster (<http://m-w.com>) as its reference dictionary. You may want to buy *The Elements of Style* by Strunk and White (it's only \$10).

2. I take plagiarism VERY seriously. Not knowing the rules does not justify a case of plagiarism. When writing (which you will do a lot), be very careful about plagiarism. You should not copy any material (even a sentence) from any other previously published material, e.g., books, papers, websites, including your own publications. If you want to mention a concept that is taken from another publication, you have to (1) rephrase it and (2) cite it. If you mention it verbatim, it has to be enclosed within quotation marks and clearly cited. IEEE (and I) is very strict about this; if IEEE catches a plagiarism case, even after being published, they will attach a note to the paper that it violates the IEEE policies and that note will remain on IEEEExplore forever and will seriously affect your career. I report such cases to WSU officials as well. For more information, please see http://www.ieee.org/publications_standards/publications/rights/plagiarism_FAQ.html. WSU provides free access to two of the best available services for plagiarism check (iThenticate and Turnitin) so you can check your work before submitting it; please see <https://news.wsu.edu/2014/>

*PDF available at http://eecs.wsu.edu/~mehrizi/LIPE_WritingInAcademia.pdf

[11/06/tools-for-faculty-students-save-time-promote-integrity](#). For any new paper you write, please check it with iThenticate and email me the similarity check report. If similarity with any single paper is more than 8% (TPWRD's guideline), you will need to rewrite or rephrase.

3. IEEE has standard abbreviations for journal titles. For example, IEEE Transactions on Power Delivery is "IEEE Trans. Power Del." IEEE Transactions on Power Electronics is "IEEE Trans. Power Electron." As much as some of these abbreviations may look weird to you, they are the only accepted and correct set of abbreviations. See http://www.ieee.org/documents/trans_journal_names.pdf for the complete list. The BibTeX file downloaded from the IEEE website does *not* have the correct journal titles. You should consistently use either the full names of journals or their standard abbreviations.
4. Prof. Wilsun Xu, the Editor-in-Chief of IEEE Transactions on Power Delivery, has prepared the following resource guide for paper preparation; it gives you an idea of how different journals operate: <http://sites.ieee.org/tpwr/>

II Grammar and Word Choice Tips

1. Please familiarize yourself with the following:
 - "Writing in Academia" at http://eecs.wsu.edu/~mehrizi/LIPE_WritingInAcademia.pdf (this document)
 - "Common Errors in English Usage" at <http://public.wsu.edu/~brians/errors/errors.html>
2. Simple and short sentences are always preferred over complex and long sentences. Show off your writing skills by expressing your ideas in the simplest form and stay away from "elaborate" language constructs that obscure the meaning. See the following real-world examples taken from samples including my own writing!
 - "the performance of the controller is dependent on the existence of the communication networks" vs. "the controller requires a communication network."
 - "The challenge in simulation of this SCE feeder is its size. The system includes 324 nodes. The large number of nodes causes the simulation to run slower than the real time." vs. "The large number of nodes (324) in this feeder system poses a challenges for real-time simulation on a typical computer."
 - Avoid redundant structures such as "The selection of the DAQ module depends on the requirement for the number of inputs and outputs and also the maximum communication rate. This is a trade-off between the capabilities of the device and its price. Based on the number of inputs and outputs needed for the controllers that need to be tested, a suitable DAQ module can be chosen."
 - "He maintains a guide on 'Academic Writing,' which will be shared with the IRES students." with "His guide on 'Academic Writing' will be shared with the IRES students."
 - "This fall, the university will name the facility that houses its College of Engineering and Applied Sciences Elson S. Floyd Hall."
 - "It is assumed that there are k capacitors that are optimally sized as $C, 2C, 4C, \dots$, and $2^{k-1}C$. We show that if one capacitor is added to the capacitor bank as the $(k+1)$ st capacitor, its optimum size is $2^k C$." with "Assume k capacitors are optimally sized as $C, 2C, 4C, \dots$, and $2^{k-1}C$. We show that the optimum size of the $(k+1)$ st capacitor is $2^k C$."
 - "Reference [16] proposes a two-degree-of-freedom voltage controller, which can robustly regulates the load voltage in the presence of unmodeled load dynamics. The controller design is not straightforward, and it can be achieved by solving an linear matrix inequalities (LMI) corresponding to a nonconvex optimization problem."
 - "I am hardly working on my BSc thesis in order to finish it as soon as possible."

- “The next switching state should be selected such that if any submodule is inserted, the insertion direction makes its capacitor voltage track the corresponding reference voltage.” vs. “The next switching state should be selected such that the direction of insertion of any submodule makes its capacitor voltage track the reference.”
 - added in fall '17: Several does not mean many. “In a GMC with several SMs, such and such is difficult to derive.”
 - added in fall '17: “In some low-voltage applications, it is desirable to have a high-resolution converter that uses only a few SMs but delivers a high-quality voltage.” compared with “In some low-voltage applications, it is desirable to synthesize a high-quality voltage with only a few SMs.”
 - added in fall '17: “The reason is that the limiter should have a larger value than the unmodified set point in the base case and even the system is saturated in the base case.” vs. “This is because the limiter should have a value larger than the unmodified set point in the base case, but the system is already saturated even in the base case.”
 - added in fall '17: Have you reviewed any papers? “I have not reviewed,” vs “I have not,” vs “I have not reviewed any papers.”
3. Never ever do we use singular first-person voice in academic writing. “I” and “me” are big nos. If you were in control or mathematics, it would be acceptable to use “we.” In power, the common practice is to use passive tense and third-person voice. Very rarely do we use anything other than simple present tense (“is” and “are”) in technical writing. In particular, past, future (“will”), present progressive (“is being”), and present perfect (“has been”) tenses are not commonly used. Certainly “would” and “could” are never used.
 4. Learn the difference between a hyphen “-,” an en-dash “–,” an em-dash “—,” and a minus sign “−.” In short and generally, a hyphen is used for hyphenated words, an en-dash is used to mean “to,” an em-dash is used to set off a parenthetical expression, and a minus sign is used in math only. These are some other usages for each of these as well.
 5. Don’t hyphenate a word unless you’re absolutely sure (see Table 1 in Chapter 7 of CMOS). “Overhyphenation” is far too common (that is, overhyphenation). Don’t trust spell checkers on this. “Bi,” “multi,” “inter,” “hyper,” “cyber,” “pre,” “non,” “mini,” “micro,” and “re” are all closed most of the time if not all the time: “preemptive” and “nonnegative.” Units that come with numbers, e.g., “115 kV,” are never hyphenated regardless of their function in the sentence.
 6. Define all abbreviations upon their first use. For example, “The total harmonic distortion (THD) of this waveform is 5%.” Do not capitalize the definition.
 7. Some punctuation tips:
 - (a) Comma and period go inside the quotation mark, even if they belong to the “sentence.”
 - (b) There is no space before comma, period, or colon. There is one *after* them.
 - (c) Colon “:” is used only after a *complete* sentence.
 - (d) Use serial comma: “a, b, and c” not “a, b and c.” Only in British English is it okay to not use serial comma.
 - (e) If you use “and” to join two complete sentences, use a comma before “and.” Don’t use a comma if the phrase after “and” doesn’t have its own subject.
 - (f) A comma precedes “when,” “where,” and “which” if they set off a nonrestrictive clause. No comma is necessary with these (or with “that”) if they signal a restrictive clause. Compare “The store honored the complaints that were less than 60 days old” (the store honored only those complaints that were less than 60 days old) with “The store honored the complaints, which were less than 60 days old” (the store honored the complaints, which by the way, were less than 60 days old).

8. “i.e.” means “that is,” and “e.g.” means “for example.” The only correct punctuation is shown in this example: “Power electronics has many applications, e.g., compensation of transmission lines.” Also “A microgrid is a cluster of collocated resources, e.g., generators, storage units, and loads, that are interfaced to the host power system at the distribution level.”
9. Equations are part of the sentence and are treated as nouns. The same punctuation rules that apply to a standard sentence apply to sentences with equations. If you are referring to an equation at the very beginning of a sentence, write as “Equation (1).” If you are referring to an equation in the middle of a sentence, use only the equation number.
10. “Begg the question” doesn’t mean “raises the question.” Begging the question is a term used to describe a logical fallacy in which a statement is claimed to be true with no evidence other than the statement itself. A very common example is a statement similar to “EE 525 is difficult because it discusses lots of complicated topics.” This statement begs the question. A usage such as “[it] begs the question of whether there are smart ways to triage this volume of imagery.” is simply wrong (example taken from Proceedings of the IEEE).
11. Make yourself aware of the difference between “between” and “among.” The difference is more complicated than the persistent but unfounded notion that “between” is for two entities and “among” is for more than two. Both “the bomb landed among the houses” and “the bomb landed between the houses” are grammatically (but perhaps not morally) correct, though they have different meanings. “Between” is used when the individual relationships are important; “among” is used when the emphasis is on the collective relationship. “There was a war between cities” means each city individually got involved in hostilities, whereas “there was a war among cities” leaves it up to speculation whether cities had formed alliances or not. Compare “she needs to choose between WSU, UW, and Gonzaga” with “she needs to choose among Washington colleges.”
12. Compare “power system imbalance” with “an unbalanced power system.” Don’t use “unbalance” (without a “d”) as an adjective, no matter how common it is.
13. All countable singular names should have an article—definite (the) or indefinite (a). On the use of articles, see the following:
 - (a) Chicago Manual of Style
 - (b) <http://www.quickanddirtytips.com/education/grammar/when-to-use-articles-before-nouns>
 - (c) <http://esl.fis.edu/grammar/rules/article.htm>
14. The plural form of a number of words is not typically used in technical writing. Examples are “researches,” “simulation,” “work,” and “response.”
15. Subject and verb need to agree with each other in number. This may sound trivial, but it is in fact one of the most difficult grammar rules to follow. In particular, if a linking verb joins two noun phrases, the verb agrees with the subject and not the subject complement: “*These features have made DTC drive systems an attractive option for industry.*” See the following for more examples:
 - (a) <http://www.towson.edu/ows/sub-verb.htm>
 - (b) <http://www.iolani.honolulu.hi.us/Keables/KeablesGuide/PartOne/Subject-VerbAgreement.htm>
16. Use “real” power, not “active” power.
17. Use “either as A or as B” or “as either A or B.” The usage “either as A or B” is incorrect. A similar rule applies to “both,” “neither,” and the like.
18. added in fall ‘17: **Read this guide! Seriously.**

III L^AT_EX Tips

1. See the following for some good L^AT_EX resources:
 - [Getting something out of L^AT_EX](#);
 - [L^AT_EX Wikibook](#);
 - [The Art of L^AT_EX](#);
 - [A \(not so\) Short Introduction to L^AT_EX](#);
 - [T_EX StackExchange](#); and
 - [TikZ graphics in L^AT_EX](#).
2. Never change the formatting of the standard style. Very rarely is it okay to use modifiers such as `\textbf{}`.
3. For multiple equations with one single equation number, use `\begin{split}... \end{split}` inside the equation environment.
4. Footnotes are not typically used in IEEE papers, but if you have to use them, remember that `\footnote` comes after punctuation mark:
`This is a sentence that requires a footnote.\footnote{This is the footnote.}`
5. Use `\sin` and `\cos` and not *sin* and *cos*. The first is `\sin` and a function. The second is `sin` and the product of variables *s*, *i*, and *n* (note italics).
6. The multiplication symbol in L^AT_EX is \times , which can be reproduced using `\times`. Do not use `*`.
7. If a subscript (or superscript) has more than one or two letters, it has to be typeset upright using `\text{}`. For example, use I_{comp} and not $I_{\textit{comp}}$.
8. Don't use `\noindent` (unless you're a L^AT_EX developer).
9. Separate the number and its unit with nonbreakable space `~` (tilde). Or better yet, use `siunitx` package.
10. When referring to a figure, use a nonbreakable space between "Fig." and `\ref{}`, that is, write `Fig.~\ref{fig:identifier}`. Similarly for `\cite`.
11. Use the package `booktabs` to format your tables. In particular, try to avoid vertical lines in tables. Use `\toprule`, `\midrule`, and `\bottomrule` commands of the package.
12. Label your chapters, section, and subsections in your papers/theses and refer to them using, for example, `Section~\ref{sec:introduction}`.
13. I understand the process of producing figures for publication is time consuming and not the most enjoyable part of writing a paper. Therefore, I suggest you use `PGFPlots` package for preparing your figures. After your first experience, it will be a great time-saver as it can directly read PSCAD (or MATLAB) output files and there is no need for you to process figures both in MATLAB and in Visio. You also don't have to worry about the font face and size and future edits will be extremely easy. Here are examples of what you can do (that is, everything) including the T_EXsource code: <http://pgfplots.sourceforge.net/gallery.html>. (For those of you who use TikZ (`\emptyset`?), `PGFPlots` is based on TikZ, which can be used to draw virtually anything, including circuits. See some examples at <http://www.texample.net/tikz/examples/>).
14. The basic editor that comes with MikTeX is awful. Do not use it. Do not use Adobe Reader either as it locks the PDF file and will not allow editing. I suggest `TeXnicCenter` and `SumatraPDF`; both are free. `WinEdt` is great too, but it is not free.

15. To be able to easily edit your papers, you need to use a feature called “inverse search,” as otherwise you will struggle quite a bit during revisions of your papers. Inverse search lets you simply double click on your PDF and it will take you to the respective line in the .tex file. For more details, see <http://tex.stackexchange.com/questions/125546/the-sumatrapdf-inverse-search-for-any-arbitrary-editor>.

16. To have IEEE style citations in documents other than papers (papers are already fine), use the following:

```
\usepackage{cite}
\def\citepunct{[, []}
\def\citedash{--[]}
```

17. added in fall '17: For figures, do not specify *both* width and height as otherwise they will look distorted and the aspect ratio will change (squares become rectangles). \LaTeX calculates the other dimension itself. Similarly, when you resize a figure (e.g., in Visio), use the anchors at the corners not the ones on the edges.

18. added in fall '17: You don't need to enclose numbers in $\$$.

19. added in fall '17: Use the right form of dots: $1, 2, 3, \dots, n$ or $1 + 2 + \dots + n$ or $\int \int \dots$ or $1 \times 2 \times \dots \times n$. See <https://tex.stackexchange.com/questions/122491/difference-of-the-dots> for more details.

20. added in fall '17: Don't get creative for things that have an established solution! Reserve your creativity for your research. For example for numbers with units, there is a package that does the correct spacing and font: `siunitx`.

IV Paper/Poster Preparation Tips

1. Avoid “widows” and “orphans,” especially when you are trying to meet the maximum page count requirement of a journal or conference. Widows and orphans are the short words or lines dangling alone at the beginning or end of paragraphs or pages. See also http://en.wikipedia.org/wiki/Widows_and_orphans. Chicago manual of style defines them as

Widow A paragraph-ending line that falls at the beginning of the following page/column, thus separated from the rest of the text.

Orphan A paragraph-opening line that appears by itself at the bottom of a page/column. Or, a word, part of a word, or very short line that appears by itself at the end of a paragraph. Orphans result in too much white space between paragraphs or at the bottom of a page.

2. When you prepare figures for your papers, posters, or slides, please use only one of the following colors: **BLACK** (RGB: 0, 0, 0), **CRIMSON** (RGB: 127, 0, 0), and **GOLD** (RGB: 255, 192, 0). This helps maintain the “visual identity” of the group. Please do your figures in MATLAB (not PSCAD). Please import to Visio, make the lines thicker, and use Georgia as the font. Use a large enough font. Save as EPS or PDF (vector formats) to import in \LaTeX .
3. When you respond to the reviewers, you need to prepare a separate document mentioning both your response and any updates/changes you are making to the paper. In the paper itself, highlight the changes so they can be easily identified by the reviewers. The following is an example of a good highlighting scheme in \LaTeX :

```
\usepackage[color]{changebar}
\usepackage{soul}
\usepackage{xspace}
\cbcolor{black}
\sethlcolor{yellow}
\newcommand{\edit}[1]{\cbstart\hl{#1}\cbend\xspace}
```

4. The introduction of a paper should have one paragraph about each of the following topics:
 - (a) General introduction and statement of the problem;
 - (b) What has been done and their shortcomings;
 - (c) What is proposed in this paper (very clearly, probably as a bullet list) and its merits as compared with the previous paragraph;
 - (d) Methodology adopted for the proposed method;
 - (e) Major conclusions and outcomes; and
 - (f) Structure of the rest of the paper.
5. Each case study in a paper should have
 - (a) Objectives and the study system;
 - (b) Steady-state initial conditions (in terms of voltage, power flow, or any other variable that is important such as load type);
 - (c) Disturbance (time, type, location, and significance);
 - (d) Results based on graphs; and
 - (e) Conclusion and reinforcement of the objective.

See a short example:

This case study evaluates the performance of GPFM in response to a load change. The voltages of generator buses 9, 10, 11, and 12 are controlled to maintain the predisturbance voltage profile. At $t = 11$ s, all loads are reduced by 10%. Fig. 5 shows the evolution of voltage in the system. For clarity, only the generator bus voltages are shown.

In response to this disturbance, GPFM updates the generator voltage set points. As a result, the voltage profile reaches the steady state in 50 s, Fig. 5(b). Without GPFM, the voltage profile settles much slower and even after 140 s, the original voltage magnitudes are not recovered, Fig. 5(a). Therefore, in this case study, GPFM reduces the settling time by 64%.

6. For your PowerPoint slides:
 - (a) Use templates (PowerPoint calls them Slide Masters). Slide masters are templates and they make your job WAY easier when you want to change the format/layout of your slides. If you don't know what they are, ask me. If you use my template (available at http://eecs.wsu.edu/~mehrizi/LIPE_PowerPointTemplate.pptx), which I highly recommend, don't create new designs. In particular, there are only very few instances when you should add a text box.
 - (b) Bullet items have to have identical sentence structure: all should be complete sentences or phrases.
 - (c) There is no need to retype your equations in PowerPoint. It is a waste of time and the result will be ugly. Use your equations in \LaTeX , zoom in enough, and copy and paste in PowerPoint. The result will still be of a higher quality than what equation editor produces.
 - (d) End your sentences with a period or semicolon.
 - (e) At least have these slides: outline, conclusions, motivation and objectives. Also be sure to mention why your method is novel. What does it offer that the existing methods don't?
 - (f) Don't include lots of equations. Nobody will read them.
 - (g) Use big fonts in figures.
 - (h) Use "notes" (that box under the slide window) in PowerPoint to write what you will say. This makes practicing much easier.

- (i) Use animations and transitions very discretely. This generally means do not use them at all. Certainly don't use animations on every slide. They take away from the seriousness of the presentation.
7. For posters and figures in your papers:
- Since posters will print in large sizes, you shouldn't use raster graphic. Use vector formats, e.g., EMF, EPS, and PDF.
 - In a poster, less is more. Don't use "text" in the same way you use it in a paper. Instead, use bullets. People don't really stop to read long paragraphs in a poster. Even if they do, they tend to skip sentences. Similarly, don't use large chunks of equations.
 - Remove hyperlinks. Hyperlink is a concept for on-screen files. Simply put your cursor right after the hyperlinks (e.g., email addresses) and press backspace once. PowerPoint removes the hyperlink.
8. Some conferences or journals ask you to embed all fonts in the uploaded PDF. However, the default setting for PDF creation is to not embed common fonts such as Times. There is an easy workaround for this. Open the PDF in Adobe Acrobat and print to "Adobe PDF." Click on Properties and under Adobe PDF Settings | Default Setting, click on Edit. In the window that opens, click on Fonts on the left sidebar and remove Times (and other fonts) from the Never Embed box. Click OK and save the profile under some name. This will take care of embedding fonts. If you don't have Acrobat, see <http://www.boekenproefschriften.nl/proefschriften/sites/default/files/EmbedLaTeXfonts.pdf>.
9. Reporting numbers is naturally very important in technical writing:
- Always use a trailing zero when you are reporting decimal numbers. That is, write "0.12" and not ".12."
 - When you are reporting numbers, they all have to have the same number of significant digits— at least the numbers that refer to the same quantity. Do not have "0.708 pu" and "0.7767 pu" in the same paragraph. If necessary, either round off or report with the smaller accuracy.
 - The units, e.g., "pu" and "kV," that come with numbers should not be set in italics. 10 kV (in \LaTeX : 10~kV) and not 10 *kV* (in \LaTeX : $\$10\sim kV\$$).
 - The SI symbol for seconds is "s" and not "sec."
10. Every single figure and table needs to be referred to in the body of your document. They also need to have a short caption. Detailed discussion of the content of the figure or table should be in narrative form in the main body of the text and not in the caption. Number every table and figure. Numbers need to include the chapter number in. For example, "Fig. 3.1" for the first figure in Chapter 3. If you are using subfigures, refer to them as "Fig. 7(c)." Do not use captions for subfigures; have only caption as "Fig. 7. Response of the system to a three-phase fault at bus 1 at $t = 10$ s. (a) without the proposed strategy; (b) with the proposed strategy." In a table or figure, all numbers must be reported with the same number of significant digits.
11. IEEE papers include a list of "index terms." This is not an arbitrary list of relevant words. At least three of the words you include need to be from the IEEE Taxonomy. This also helps expedite the review process as editors use this list to assign reviewers. You can find the IEEE Taxonomy at https://www.ieee.org/documents/taxonomy_v101.pdf or just Google "ieee keywords".
12. Having beautiful equations can get tricky in certain situations. An authoritative guide on typesetting mathematics is the following, prepared by the American Mathematical Society: <ftp://ftp.ams.org/pub/author-info/documentation/howto/mit-2.pdf> Here is another good document: http://moser-isi.ethz.ch/docs/typeset_equations.pdf
13. When you send me the paper for final submission to an IEEE journal, please include the following. Details are on ManuscriptCentral; click submit a new manuscript.

- At least three keywords from ManuscriptCentral.
 - Two “technical topic areas” from ManuscriptCentral, which is different for each journal.
 - Similarity report.
 - The response to self-evaluation questions and ratings (if it is for TPWRD).
14. added in fall '17: Downsample your figures before you include them in your papers. In MATLAB, which you should use to process your figures, you can easily do this by a simple statement like `x = x(1:10:end);`.
added in fall '17: This becomes specifically an issue when we need to submit the PS file (not PDF file) for certain transactions and the PS is around 10 times larger than PDF—most transactions have a maximum file size limit of around 40 MB.
 15. added in fall '17: Many journals now strictly enforce their page limit. Even if they don't, I will. A more succinct paper is always more clear, more to-the-point, and easier to follow. In this modern age, people don't have the time to read long (even 8-page) papers.
 16. added in fall '17: Consistency and visual identity is key. People should be able to instantly recognize that a paper is from our lab by looking at the graphics and language.