

IEEE Control Systems Magazine

Authors' Guidelines for Manuscript Preparation

This document describes the style required for manuscripts submitted to *IEEE CSM*. Manuscripts that are accepted for review, must be syntactically correct, well written, and in accordance with this document. Please read and follow these instructions with care. Please feel free to contact the Editor-in-Chief with questions or comments.

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Formatting

- Please email your manuscript to the Editor-in-Chief Dennis S. Bernstein dsbaero@umich.edu as a **PDF** attachment. The Editor-in-Chief will check your submission for conformance with the contents of this author's guide.
- **Please number your pages clearly, at the bottom, and centered.**
- **You may use Word or LATEX. LATEX is preferred for articles with numerous equations.**
- **The maximum length for manuscripts is 35 pages** in 12-point font, **double-spaced** excluding figures. Submitted manuscripts must be typeset in a **single-column** format (that is, do not use the double-column format used for conference papers). **However, longer manuscripts of high quality—especially tutorial articles—will be considered. Please check with the editor-in-chief in such cases.**
- **IEEE CSM articles are intended to inform the control engineering community of developments in specialized areas of control.** Therefore, submissions should strive for high-quality exposition that explains the principal issues and challenges of their applications area. At least some of the introduction must be of a tutorial nature that introduces nonexperts to the area of application.
- **Do not include an abstract.** No abstract is needed or allowed.
- **Do not number sections.** Center and boldface all major section headings, and left-align and boldface subsection headings. For subsubsections, use italic, nonbold font.
- **List references in the order of citation in the text.**
- **Do not put http:// addresses in the text. Rather, put www addresses (with the name of the web page) in the reference list, and refer to such items as appropriate within the text.**
- **Please format references in the *Magazine's* style (see below).**
- **Do not use footnotes of any kind for any purpose.**
- **Use double spacing throughout, and skip an EXTRA, BLANK line between successive paragraphs.**
- **Use margins that are about 1 inch on all sides, allowing for US size paper.**

- **Unless your article is a survey, please limit your reference list to essential items. A good rule of thumb is about 1 reference per manuscript page. On the other hand, be sure that your references adequately capture prior relevant research. If you plan to include a large number of references, please consider relegating some to a sidebar.**
- **The *Magazine* encourages attractive color illustrations, figures, and photos.**
- **Digital images must be at least 300 dpi of size 4 inches by 4 inches to be publishable.** Be sure to scan your photos at adequate resolution.
- Please include a short biography of each author. **Please include the mailing address, email, telephone number, and fax number of the corresponding author.**
- **Before final acceptance**, you will be sent a copyedited version of your original manuscript. Please make the corrections indicated in the interests of improving the readability and appearance of your article as well as to ensure uniformity with the *Magazine's* style.

Writing Guidelines

In preparing your article for the *IEEE Control Systems Magazine (CSM)*, please note the following guidelines concerning writing style. *IEEE CSM* places high emphasis on the quality and precision of exposition. Articles that are not well written cannot be considered for publication.

Most of the guidelines below reflect standard writing practice. However, a few of these guidelines are specific to *IEEE CSM*.

Title

IEEE CSM titles are in two parts, typeset in the exact style below.

*The Title (note the use of initial caps and **no** colon)*

Not too Long but Captures Main Idea

The Subtitle on a separate line (note that only the first word is capitalized)

Could be a little longer to describe content of article

Please choose the title and subtitle carefully. Here is an example:

Control of Quantum Systems

**Subatomic phenomena
with application to feedback systems**

No colons are allowed in either the title or the subtitle. Avoid using the same word in both the title and subtitle.

Sentences and Paragraphs

First, and most importantly, write simply and clearly. Use clear and simple sentences, and arrange them in logical order.

A good rule of thumb is to try to minimize the use of colons, semicolons, quotation marks, and parentheses. Please strive for a smooth, linear writing style.

Carefully introduce terminology, and use your terminology precisely and consistently. Write with precision and clarity.

Use the first part of your introduction to introduce readers to your area of application. Do not assume that readers know anything about your application. Tell readers about the control issues and challenges that arise and why these issues are important. Use examples to illustrate these issues and challenges.

A long, complex sentence can often be divided into two shorter sentences that are easier to read. Do not try to say too much in a single sentence.

When a sentence has multiple clauses, arrange the clauses carefully. Try to keep each clause close to the noun that the clause modifies.

Organize sentences into coherent paragraphs of reasonable length. A paragraph can be as short as one or two sentences but usually not longer than half of a page. The opening sentence of each paragraph announces the content of the paragraph. The closing sentence completes the thought. Start a new paragraph whenever you change thoughts or topics.

Organize paragraphs into sections, subsections, and subsections with common themes. Give careful consideration to the section/subsection/subsubsection structure of your article. Your article should have a natural flow and organization that helps the reader understand your thought process.

The ideal length of a paragraph is 1/3 to 1/2 of a page. Try to avoid paragraphs that are longer than 3/4 of a page.

Unlike the document you are reading, indent every paragraph **without exception**. Use an indentation of 2 cm.

Like the document you are reading, leave an EXTRA BLANK line between successive paragraphs so that the reader of your article can see precisely where each paragraph begins and ends.

Writing Style

Try starting some sentences with “Although.” Try connecting clauses with “while,” which essentially means “and,” or “whereas,” which essentially means “while, however,”.

Since x and y are real, it follows that $x+y$ is real. It follows from (3) that x is negative.

The function f , whose domain is a closed set, is continuous.

Replace “Our goal is to determine if x is real.” with “Our goal is to determine whether x is real.” Note the use of the word “whether.”

Replace “If the temperate is high, then the ice melts.” with “When the temperature is high, the ice melts.” In other words, “when” is more appropriate than “if” in some instances.

It is often helpful to begin a sentence with “Although.”

Multiple “and’s” can be confusing. For example, replace “The simulation uses linear and nonlinear models and variable-step integration.” with “The simulation uses linear and nonlinear models as well as variable-step integration.”

It is sometimes helpful to write “A is true whether or not B is true.”

OK: You can *only* enroll in four courses. Not OK: You can enroll in *only* four courses. This error occurs often.

Like most periodicals, *IEEE CSM* does not use the trademark symbols ™ or ®.

Do not say “so-called.” Instead of saying “The controller uses the so-called Smith method for stability.” you may say “The controller uses a stability technique known as the Smith method.”

Whenever using technical terms that might not be well known to a wide audience, either embed the definition in the sentence or write in such a way that the reader can infer the meaning from the context. For example, “The controller is based on feedback linearization, that is, inversion of the nonlinearities.” or “The controller is based on feedback linearization, a control algorithm that inverts the nonlinearities.”

Be careful of “could,” “would,” and “should,” since these words have subtle and ambiguous meanings in referring to status or contingency. The word “must” is often more precise than “should.”

Be careful of “generally,” which means “often” or “usually” but is otherwise imprecise.

Control engineers *might* find alternative software helpful. Many writers use the word “may” to mean “might,” and this usage is acceptable but suboptimal. Possibilities: The software may be useful. The software might be useful. The software is potentially useful. Not good: The software could be useful. The software should be useful.

Rewrite “In order to be a control engineer, you need to know calculus.” as “To be a control engineer, you need to know calculus.” Rewrite “The Bode plot is needed in order to find the gain margin.” as “The Bode plot is needed to find the gain margin.”

Avoid using *very* overused words that might exaggerate and provide little information. Many writers use *quite* a lot of these words, which might appear to be *extremely* helpful. In general, minimize the use of adverbs.

Write factually, and err on the side of understatement. Avoid hype, that is, hyperbole. Use the words “extremely,” “many,” “quite,” and “very” sparingly.

Avoid repetition. Do not repeat what you have already said. However, an exception to this rule is that figure captions must be written to summarize and highlight the main points in the text. Consequently, repetition between the text and figure captions is encouraged.

Avoid non-sequiturs. In particular, be sure that successive sentences follow in a logical, coherent manner, with clear and logical flow.

Please avoid subjective statements, which have no firm basis, as well as rhetorical questions, for which answers are not expected. For example, do not say “It is important for engineers to develop teraflop computers that cost less than US\$100.” or ask “What could be more important than solving this problem?” Avoid asking the reader questions in general.

Avoid vague statements based on hypothetical situations. Write with specifics.

Try to avoid using “one” as the subject of a sentence. OK: We expect to find that... Not OK: One expects to find that...

Try not to use more words than are needed to make your points. Avoid excessive verbiage allowing a small amount of redundancy for fault tolerance.

Try to avoid starting sentences with “There are” or “There is.” Weak: “There are many models that are ill conditioned.” Stronger: “Many models are ill conditioned.”

In IEEE CSM it is perfectly fine to split infinitives. Sounds awkward: “To prove easily Theorem 3, we use the Nyquist test.” Sounds much better: To easily prove Theorem 3, we use the Nyquist test.”

The correct use of “a,” “the,” and “this” is challenging, especially for non-native speakers of English. Think of “a” as meaning “some,” while “the” refers to a specific or unique object. The adjective “this” refers to an object that has already been specified. Omit “the” when used twice in a row such as in “The inverse and [the] transpose of the matrix A are given by (3) and (4), respectively.” Despite these simple rules, subtle cases can arise, although with some thought the correct usage usually becomes evident. In some cases, it is best to use neither “the” nor “a.”

An example: “The algorithm is based on a colored noise model. A noise term is included in the state equation. The process noise w has stationary statistics. Noise is known to degrade the performance of estimation algorithms.”

Tense

Imagine that your paper is unfolding in the present. Therefore, write in the present tense as much as possible. Past tense is acceptable only for describing truly historical events. Try to avoid excessive reportorial writing. In fact, most experimental or computational results can be described as if they are unfolding in the present.

Furthermore, it is usually possible to avoid the use of the future tense. Replace “We will investigate this problem.” with “We plan to investigate this problem.” Replace, “This controller will solve many difficult problems.” with “This controller is expected to solve many problems.”

These rules *are* written for the benefit of *IEEE CSM*. The experimental results *show* the validity of the method. The pressure variable, shown in Figure 3, *indicates* increased drag due to surface roughness. The results of [7] *suggest* that saturation can degrade performance. It *is shown* in [6] that x is real. The results given in the next section *show* that the plant is nonlinear. We *plan* to solve this problem next year. This project *is expected* to begin next year.

Equations

Punctuate every equation as a smooth, integral part of the sentence, using commas and periods as appropriate. Most equations in *IEEE CSM* articles have a comma or period at the end. That is, punctuate each equation as part of a sentence in a grammatically correct manner.

Be absolutely sure that every symbol in every equation is precisely defined with appropriate dimensions or units.

Good: It follows from Newton's second law

$$f = ma,$$

where a denotes acceleration, that force is proportional to mass. Hence,

$$a = f/m.$$

Do not precede equations with a colon. Do not use the word “following” to introduce an equation. The first equation above is an appositive. The second equation provides the verb to the sentence.

A comma is used at the end of every equation in a list. Use a comma at the end of an equation that is followed by “where.”

Do number all equations that you need to refer to. Number equations in the style (1), (2), (3). It is usually not necessary to number equations that are not referenced. However, it is preferable to number an equation and refer to the equation by its number rather than writing “the above equation.” In other words, number equations so that you can refer to them easily, and use the numbers.

Do not use a single number to reference multiple equations. It is better to give a separate number to each equation.

Center every displayed equation.

Try to avoid including words on the same line as a displayed equation. An exception is “for all.”

Acronyms

Acronyms are useful for streamlining the discussion. Define acronyms at the first opportunity, and then use the acronym consistently:

In this article we use a model reference adaptive controller (MRAC) for stabilization. This MRAC can be used to control uncertain, minimum phase plants.

The following rules apply to the use of acronyms.

Rule 1: Define all acronyms except those that represent names of commercial products. Although MIMO, SISO, and PID are widely used, it is usually a good idea to define these acronyms.

Rule 2: To define an acronym, use the words first, followed by the acronym in parentheses. “The nonlinear backstepping (NBS) controller stabilizes the system.”

Rule 3: Do not introduce an acronym that is not used subsequently.

Rule 4: Consider not introducing an acronym that is subsequently used only a few times.

Rule 5. Be conservative in introducing acronyms. The sentence “The MV for the ODE was used in the MIMO PID FLC.” is unpleasant to read.

Rule 6: Do not use acronyms in a figure caption unless an acronym appears in the figure itself, in which case, redefine the acronym in the caption.

Punctuation

Avoid the excessive use of parentheses, colons (:), semicolons (;), and dashes (—). Simple, clear sentences are the most effective. Not desirable: “The equation has three real solutions: A, B, and C.” Better: “The equation has three real solutions, namely, A, B, and C.”

Do not use bulleted lists, that is, lists that use bullets (•). A few lists without bullets are OK from time to time. In most cases, try to write in text form. Your article is not a PowerPoint presentation.

Include the comma preceding “and” when referring to multiple items, such as x , y , and z . Please follow this rule consistently in your article. Likewise, write x , y , or z .

A comma is needed to separate clauses in compound sentences, and this rule is universally followed. Note the comma before “and.”

If an introductory phrase is especially long, then insert a comma. If not then don't.

Omit the commas surrounding short appositives. For example, “the state variable, x , is a vector” should be written as “the state variable x is a vector.”

Italics, Quotation Marks, and Bold

Italics are appropriate for defining technical terms that have specific meaning. In particular, italics can be used when a word or phrase is first defined:

The *predictive update law*, given by (1)-(3), is nonlinear. We now show that the predictive update law yields Lyapunov stability.

Italics *can* be used for emphasis, but only extremely rarely.

Use italics for all mathematical variables such as x in $y = f(x)$.

Quotation marks can be used to indicate that a word such as “dog” is singled out for discussion or if a word is used in a nonstandard way such as my “pet” controller. Such usage should be extremely rare.

In general, please make every effort to minimize the use of italics for emphasis and quotation marks for nonstandard language.

Unlike the document you are reading, do **not** use bold font for emphasis. Bold font can be used for math variables, but only as a last resort.

Hyphens

The rules for hyphens are reasonably logical, but somewhat involved. Unfortunately, the use of hyphens is not universally agreed upon. *IEEE CSM* uses specific rules, which must be followed.

Use hyphens for multiple modifiers such as “computer-based synthesis” or “Lyapunov-function analysis” to show that the first word modifies the second word. However, the hyphen is usually omitted in often-used phrases such as “control system design” or “distributed parameter system,” where no ambiguity is possible.

There is no hyphen in the phrase “higher order system,” but there is a hyphen in “highest-order system.” There is no simple reason for this convention, which varies among continents.

The use of hyphens is a little more logical when adverbs are involved. The hyphen is omitted in “fully developed theory” since “fully” is an “ly” adverb, and thus it is clearly an adverb. There usually *is* a hyphen between the adverb and the adjective when the adverb does not end in “ly.” For example, “a well-known person” or “ill-posed problem” or “best-selling car” is hyphenated.

Be sure to note that “John is well known” does *not* have a hyphen since “is well known” is the predicate. Likewise, a “positive-definite matrix” is hyphenated, whereas “The matrix is positive definite” is not hyphenated.

Note the spelling of these words as single words with no hyphen: aeroelastic, aeroservoelastic, allpass, axisymmetric, backup, bandpass, bandlimited, breakpoint, buildup, closeup, colocated, coprime, countdown, counterclockwise, crossover, cutoff, deadzone, drivetrain, electromechanical, feedback, feedforward, feedthrough, flyby, gearbox, geartrain, hardwired, highpass, inline, lightweight, lookup, lowpass, multidisciplinary, multilevel, multirate, multiscale, multistep, narrowband, nonadaptive, noncausal, noncolocated, nonconservative, nonconvex, nondestructive, nonempty, noninvasive, nonlinear, nonminimum, nonnegative, nonrepeating, nonsquare, nonuniform, nonzero, offboard offline, offset, offshoot, offsite, onboard, ongoing, online, onsite, passband, piecewise, powertrain, preset, rewritten, scaleup, setpoint, setup, shutdown, sideslip, speedup, spinup, startup, subdivision, suboptimal, subregion, subsection, substep, subsystem, swingby, swingup, teamwork, testbed, tradeoff.

However, the following verbs have no hyphen: back up, build up, close up, look up, ramp up, scale up, set up, shut down, speed up, spin up, start up, trade off.

Use a hyphen in multi-input, multi-output, ramp-up, and ramp-down.

The engineer ran a real-time simulation. The simulation runs in real time.

The positive-definite matrix satisfies the Riccati equation. The solution of the Riccati equation is positive definite. Note that a hyphen is not used in the predicate.

Prefixes such as anti, bi, co, counter, de, in, inter, intra, multi, non, off, on, out, over, post, pre, proto, pseudo, quad, quasi, re, self, semi, sub, super, trans, tri, under, and uni might or might not warrant a hyphen. When in doubt, do not use a hyphen.

Likewise, suffixes such as by, down, in, ite, less, out, up, and wise might or might not warrant a hyphen. When in doubt, do not use a hyphen.

Do not use a hyphen in coauthor, cochair, codirector, coeditor, cosupervisor, coworker, cofounder, cooperate, and coordinate. Do use a hyphen in co-owner.

The system has three degrees of freedom (DOFs). A six-degree-of-freedom (6DOF) robotic arm is used for the experiment. Note the singular word “degree” in the latter phrase and the lack of a hyphen in 6DOF.

The abbreviations 1D, 2D, and 3D can be used.

The testbed uses a 3-foot-long table. The table is 3-feet long.

Capitalization

When in doubt, use lower case letters.

Do not capitalize names of technical items. For example, write “linear-quadratic,” but do not write “Linear-Quadratic.” Always capitalize acronyms as in “linear-quadratic (LQ).”

Write “Figure 3” and “Chapter 4,” but also write “figures 3 and 4” and “chapters 5 and 6.” Likewise for “Section 3,” “Theorem 3,” and “Example 3,” as well as “sections 3 and 4,” “theorems 3 and 4,” and “examples 3 and 4.”

We write “Editor George Smith” and “George Smith is the editor.” Note the difference in capitalization due to the editor as a title or the name of the position.

Write ac and dc for AC and DC.

Write Matlab and Simulink, not MATLAB and SIMULINK.

Write dSpace.

Units

Write units without italics and with a space after the number. Correct: “3.57 mm”.

Wrong: “3.57mm”. Wrong: “3.57 mm ”.

IEEE CSM uses “s” for second and “h” for hour. Also, use “l” (ell) for liter, but be sure that “l” is distinguishable from the number “1” in the font that you are using. It is best to use “ℓ” (script lower case “ell”) for liter if possible.

Use “bit” for bit.

Write “US\$100” or “US\$100 million” for money.

Note the use of a hyphen in the units N-m, N-m-s, and kg-m².

Spelling

English has some tricky spellings and a few tricky verbs. In addition, some spellings are not uniform among English-speaking countries.

Leaders *lead*, and plumbers work with *lead*. Last week the *leader led* the group.

Today I *read* a book. Yesterday, I *read* a book. Yesterday, the *reader read* a red book.

Today, I *lay* down the book. Yesterday, I *lay* down the book. Last week, I had *laid* down the book.

Today, I *lie* down on the floor. Yesterday, I *lay* down on the floor. Last week, I had *lain* down on the floor.

Noise can *affect* the performance of the algorithm. The noise has an *effect* on the performance of the algorithm. A good leader can *effect* change in an organization. Verb, noun, verb.

Toward, not towards. Upward, not upwards. Downward, not downwards. Backward is fine.

Watch out for double “ells.” The system was *modeled*, and *modeling* is important. The figure is *labeled*, and *labeling* is important. The system was *controlled*, the poles were *canceled*, and instability was due to a *cancellation*. These spellings are not completely logical.

Be aware of *assure*, *ensure*, and *insure*. You *assure* someone who is anxious, you *insure* your car, and you *ensure* stability by using a Lyapunov function.

“Cannot” is one word except in very rare instances such as “the controller can not only stabilize the system but also reject disturbances.”

For abbreviations and symbols, do not use a font in which the number 1 looks identical to the letter l. If possible, use the lower case script “ell” symbol, that is, “ℓ”, to avoid ambiguity.

IEEE CSM uses “parameterize” and “parameterization,” but **not** “parametrize” and “parametrization.”

Replace spellings such as

centre, colour, honour, behaviour, emphasise, optimise, generalise, diagonalise, centralise, visualize, recognise

with

center, color, honor, behavior, emphasize, optimize, generalize, diagonalize, centralize, visualize, recognize

Words to Be Aware of

Use “that” for essential (defining) clauses and “which” for nonessential (non-defining) clauses. This rule, *which* is useful, may take some practice to master. Rules *that* are important are often useful. The relative pronoun “which,” which should not be confused with the adjective “which,” should always be preceded by a comma except when used in the phrases “in which,” “for which,” and “from which.”

Never use “this,” “these,” or “they” as nouns. Wrong: *This* is very important. Correct: *This* rule should not be overlooked. Wrong: *These* are important points. Correct: *These* points are important.

Likewise, do not use “It” as the subject of a clause. Wrong: *It* is a stabilizing controller. Right: The PID controller is stabilizing. OK: *It* turned out that the error converged to zero. Similar comments apply to “its.”

Replace “via” with “by means of.” Replace “get” and “got” with “obtain” and “obtained.” Replace “like” with “such as.” Do not use “etc.” or “and so forth.”

Try “however” instead of “but.” Better yet, try starting the sentence with “Although.” The word “nevertheless,” which is a variation of “however,” is sometimes useful.

Do not use “as” when you mean “since.”

Do not use “e.g.” or “i.e.” Replace “e.g.” with “for example,” “for instance,” or “such as,” and replace “i.e.” with “that is.”

Do not use “viz,” “cf,” or “ibid.”

Do not use “w.r.t.” Rather, use “with respect to.”

OK: *It* turned out that the phase margin was smaller than expected.

Not OK: *It* was 20 degrees.

“We recorded experimental data, which are given in Table 1.” Note that “data” is a plural word.

Do not use the mathematical symbols upside-down A to denote “for all” or backwards E to denote “there exists.” Do not use double arrows for “implies.” Use English words in mathematical statements.

Do not use the word “propose” anywhere in your article. In particular, instead of writing “the proposed method,” provide a name for the method, and refer to the method by its name. Also, instead of saying “the method proposed in [6],” say “the method developed (or derived or given) in [6].”

In *IEEE CSM*, as in mathematics, the word “or” is an *inclusive or*. That is, the statement “Either A or B is true” does not preclude the possibility that both A and B are true. Do not use “and/or,” which presumably denotes inclusive or (in English, the word “or” is sometimes interpreted as an exclusive or, which motivates writers to use “and/or” as an inclusive or). If you require an exclusive or, write “Either A or B is true, but not both.” If you followed all of this, you are doing well!

Do not use “or” to mean “that is.”

Note the difference between the statements “I do not have a house and a car.” and “I do not have a house or a car.”

Replace “based upon” and “depend upon” with “based on” and “depend on.”

The word “any” is sometimes problematic in writing mathematics since “any” sometimes means “all” while other times “any” means “some.” Try to avoid using this word in mathematical statements.

Note the difference between “alternate,” which refers to switching, and “alternative,” which refers to a different choice. Also, the word “alternates” is a verb. Example: We shall meet on alternate Mondays to discuss an alternative power supply that alternates between high and low voltage.

“The new method has the advantage of speed.” “Advantage” compared to what other methods?

“The new method is relatively easy to apply.” Relative to what? More generally, in all uses of comparative verbiage such as “The new method is easier to apply.” it must be clear as to what the comparison is with respect to.

Replace “has the ability to,” “is able to,” and “is capable of” with “can.”

Change “utilizes” and “makes use of” to “uses.”

Never, ever use the vacuous phrase “a number of.”

Control engineers *can* analyze control systems. Control engineers *may* use Matlab. Control engineers *may* or *might* become famous.

Consider replacing the somewhat-vague word “other” with one of the words “alternative,” “additional,” or “remaining.”

Be aware and beware of the words “actual,” “still,” “even,” and “such,” which sometimes are used to compensate for weak sentence structure.

The word “various” is often more appropriate than “different.” Not good: “We consider different cases.” Good: “We consider various cases.” which is more concise than “We consider a variety of cases.”

Beware of the word “common” since this word has two separate meanings. The technical meaning of “common” is “shared” as in “a common denominator” or a “common power source.” The word “common” also means “ordinary” or “everyday,” but this usage is imprecise and somewhat colloquial. Try to avoid this usage of the word “common.”

Do not confuse “principle” and “principal.” Principle is a noun as in “the principles of motion.” However, principal is a noun or an adjective as in “the principal of the school” and “the principal method.” Example: The principal taught the principles of the principal method.

Use “U.S.” as an adjective, and USA for addresses.

Figures, Tables, and Captions

Be sure that every figure and table is well motivated and transmits an important point in relation to the main ideas of the article. *IEEE CSM* uses a descriptive and informative style for figure and table captions that enhances the impact and appeal of figures. This style is required for every figure and table. You can think of a figure or table caption as a summary of what you would say if you were presenting the figure or table in a PowerPoint presentation.

Each caption should be informative, interesting, and helpful. The figure or table caption should provide a summary of the main points from the text. Therefore, repetition between the figure caption and text is encouraged. A figure or table caption can also be used as a mini-tutorial for the reader. Please see examples later in this document, and consult any recent issue of *IEEE CSM*.

Do not include labels above plots.

Avoid using acronyms in figures and figure captions so that the figure captions can be read independently of the text. If an acronym appears in a figure, then please redefine the acronym in the figure caption.

Please be sure that every figure, table, and sidebar (except figures and tables inside sidebars) is cited in the main text.

You may place the figures within the text or you can collect all figures on separate pages at the end of the document. The latter is slightly preferred. IEEE will place the figures at the appropriate place when your article is typeset.

It is the **responsibility of the author** to obtain copyright permission for all materials that are subject to copyright protection. **It is the author's responsibility to obtain this permission prior to final acceptance of the manuscript.** You do **not** need to obtain copyright permission **before** you submit your article.

Each relevant figure caption must include an explicit statement that permission has been given. At the end of the figure caption, include a statement such as “(With permission of Smith and Jones Publishers.)” or “(Image courtesy of Technocontrol, Inc.)”

Sidebars

A sidebar is a self-contained digression that provides additional information in support of the main text. Sidebars are strongly encouraged since readers find these digressions useful and informative.

Every sidebar must be mentioned in the main text using the style ‘For further information, see the sidebar “How Does Fusion Work?”’

Clearly label each sidebar for typesetting purposes using the style “Sidebar: How Does Fusion Work?”

You may label figures in a sidebar using the style Figure S1. In LATEX, try `\tag*{\mbox{\rm{(S1)}}}`.

A sidebar may contain references and a separate reference list.

You may set each sidebar in a box if you wish.

It is best to put sidebars at the end of your paper. IEEE places each sidebar appropriately based on where it is mentioned in the main text.

References

General Guidelines

All cited references must be reasonably accessible. Internal reports, theses, and dissertations are not viewed as being reasonably accessible, and are thus highly discouraged for use in the reference list. IEEE CSM is an archival publication, whose articles are backed up by other archival publications.

Obscure or unpublished documents that can be accessed from the web can be mentioned within the context of a URL address. That is, please provide a website from which the document can be obtained.

All references need to be complete and accurate in the sense of authors, pages, volume, title, date. Issue number is not crucial.

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- [1] A. Smith, B.C. Jones, and J. Doe, "Control is cool," in *Proc. 123rd Conf. on Being Cool*, Anchorage, AK, 1999, pp. 123-234.
- [2] A. Smith, B.C. Jones, and J. Doe, "Control is cool," *Trans. Contr. Coolness*, vol. 1, no. 1, pp. 123-234, 1999.
- [3] A. Smith, B.C. Jones, and J. Doe, "Control is cool," in *Control and Coolness*, I.M. Aneditor, Ed. Boston: Minuteman Press, 1999, pp. 123-234.
- [4] R.P. Bemis, Ed., *Control and Coolness*. Holyoke: Hillview Press, 1999.
- [5] W.M. Burke, *Control in Extreme Climates*, Minneapolis, MN: Environmental Press, 1999.

Here are some examples involving online sources:

- [6] A. Smith. *The Dictionary* (10th ed.) [Online], May 1, 2000. Available at <http://www.thedictionary.com>.
- [7] A. Smith, "Control is cool," *IEEE Trans. on Control Systems Technology* [Online], vol. 20, no. 2, pp. 5-10, June 2000. Available at http://www.ieee.org/organizations/pubs/pub_p_review/cst_toc.html.
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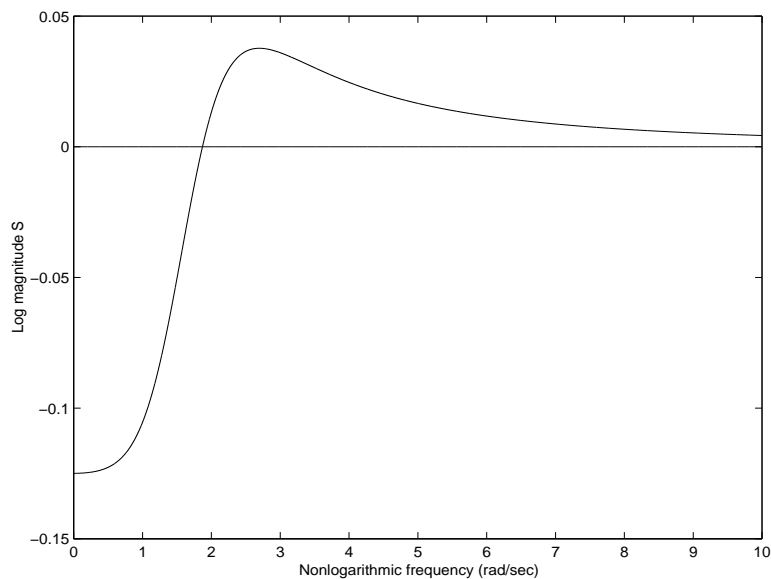


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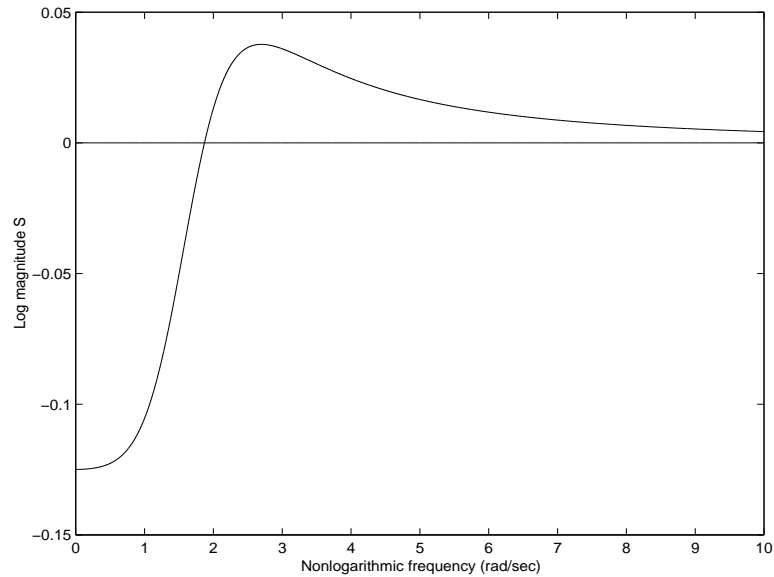


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