

Common English errors in mathematical papers

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Articles

WRONG: *The function $-e^{-x}$ ~~is derivative~~ of e^{-x} . The function $-e^{-x}$ is ~~not~~ derivative of e^{-x} .*

RIGHT: *The function $-e^{-x}$ is the derivative of e^{-x} .*

COMMENTS: The noun *derivative* is “countable”—it cannot occur without an article. The sentence with the indefinite article means that $-e^{-x}$ is SOME derivative of the function e^{-x} , which does not make sense, because the derivative is uniquely determined.

WRONG: *Let U' be ~~the~~ linear complement of the subspace U in V .*

RIGHT: *Let U' be a linear complement of the subspace U in V .*

COMMENTS: There are many complements of U ; if you have in mind any of them, you have to use the indefinite article. On the other hand, you can say: *Let U' be the linear complement of the subspace U in V , described in Remark 2*—here you are specifying WHICH complement you have in mind.

WRONG: *~~Such operator~~ is defined by...*

RIGHT: *Such an operator is defined by...*

COMMENTS: The word *such*, when appearing before a singular countable noun, is followed by *a/an*.

EXCEPTIONS: This rule does not obey if *such* is preceded by a quantifier: *one such map; for every such map; some such difficulty*.

WRONG: *In ~~the Section 2~~*

RIGHT: *In Section 2*

COMMENTS: If a series of objects are numbered by positive integers, corresponding to ordinal numbers, no article is used: *in Section 2; on page 4; in row n* .

However, often the numbering/labelling is not as direct and then *the* may appear; e.g. usually we write *Definition 2.1*, but you can say both *inequality (2.1)* and *the inequality (2.1)*.

WRONG: *~~The~~ closed sets are Borel sets.*

RIGHT: *Closed sets are Borel sets.*

COMMENTS: *The* does not mean “all”. If you talk about things in general, use no article.

EXCEPTIONS: This rule does not obey in some constructions with *of*—it is understood that the generality is somehow limited here:

- *The members of the collection U are called the open sets of X .*

Also, use *the* when you are talking about a set as a whole:

- *The linear operators on V can be identified with the matrix space M .*

WRONG: *The ~~number of the~~ solutions of (1); the ~~set of the~~ solutions of (1)*

RIGHT: *The number of solutions of (1); the set of solutions of (1)*

COMMENTS: On the other hand, you say e.g. *the union of the sets U_i* .

Singular or plural?

WRONG: *There is a ~~finite number~~ of elements such that...*

RIGHT: *There are a finite number of elements such that...*

COMMENTS: Here the quantifying expression *a finite number of* has the same meaning as *finitely many*, and it has the same syntax, i.e. it requires a plural verb.

Which tense to use?

WRONG: *In 2008 Fox ~~has shown~~ that...*

RIGHT: *In 2008 Fox showed that...*

COMMENTS: If you are giving a date, it is understood that you are thinking about a definite moment in the past; you then have to use the *Simple Past* tense.

However, you can well say, without specifying the time: *Fox has shown that...*—Fox proved something in the past, but when talking about it, you are also thinking about the present: IT IS PROVED NOW, because he proved it (no matter when). In such circumstances, use the *Present Perfect* tense.

Syntax of verbs

WRONG: *~~Let F denotes~~ a function such that...*

RIGHT: *Let F denote a function such that...*

COMMENTS: *Let* is the imperative of the verb *to let* and has to be followed by an infinitive (without *to*). You can also say: *We let F denote a function...* or *Let us denote by F a function...*

WRONG: *This lemma ~~allows to~~ prove the theorem without using (2).*

RIGHT: *This lemma allows us to prove the theorem without using (2).*

COMMENTS: The verb *allow* requires an indirect object: you have to say WHOM the lemma allows to prove the theorem. If you do not want to say that it allows you (“us”), you can say: *This lemma allows one to prove the theorem*, that is, it allows you and the reader.

You can avoid adding *us/one* by using a noun or an ing-form:

- *This lemma allows proving the theorem without the use of (2),*
or the passive voice:
- *This lemma allows the theorem to be proved without using (2).*

The same problem concerns the verbs *enable* and *permit*. Here are examples of their correct use:

- *Repeated application of Lemma 2 enables us to write...*
- *Theorem 3 enables discontinuous derivations to be built.*
- *This will permit us to demonstrate that...*
- *Formula (6) permits transfer of the results in Section 2 to sums of i.i.d. variables.*

Another verb requiring an indirect object is *remind*:

WRONG: *The purpose of this section is to ~~remind some~~ results on...*

RIGHT: *The purpose of this section is to remind the reader of some results on...*

If you do not want to involve the reader, you can use *recall*:

- *The purpose of this section is to recall some results on...*

WRONG: *We should ~~avoid to use~~ (2) here, because...*

RIGHT: *We should avoid using (2) here, because...*

COMMENTS: After some verbs you cannot use an infinitive; they have to be followed by an ing-form. These include *avoid*, but also *finish* and *suggest*:

- *After having finished proving (2), we shall return to...*
- *This suggests investigating the solutions of...*

Here are other similar examples:

WRONG: *Section 3 is ~~devoted to prove~~ this theorem.*

RIGHT: *Section 3 is devoted to proving this theorem.*

WRONG: *The ~~possibility to obtain~~ a better bound*

RIGHT: *The possibility of obtaining a better bound*

All that glitters is not gold

WRONG: *~~Every subspace of V is not of the form (3).~~*

RIGHT: *No subspace of V is of the form (3).*

COMMENTS: Using *all* or *every* with a negative statement is risky, as shown by the above proverb, which says of course that NOT ALL that glitters is gold, although at first sight it may seem (to a non-native speaker of English) that something is being stated about “all that glitters”. Therefore, constructions with *no*, *none*, *never* etc. are preferable.

Every or any?

WRONG: *For ~~every two maps~~ f and g ; for ~~every positive integers~~ m and n*

RIGHT: *For any two maps f and g ; for all positive integers m and n*

COMMENTS: *Every* has to be followed by a singular noun: *for every map*.

EXCEPTIONS: The combination *every two* can appear when talking about frequency, e.g. *The government changes every two months*.

Not or non-?

WRONG: *A ~~not empty~~ set*

RIGHT: *A nonempty set*

COMMENTS: If you want to negate an adjective that appears before a noun (*attributive position*), you have to use *non-*: *a nonempty set*; *a non-locally convex space*; *a non-Euclidean domain*. Using *not* is only possible when the adjective follows the verb *be* (*predicative position*): *This space is not Euclidean*.

First or at first?

WRONG: *~~At first, we prove~~ (2)*.

RIGHT: *First, we prove (2)*.

COMMENTS: *At first* is used when you are talking about what happens in the early stages of an event, in contrast to what happens later: *It might seem at first that the noncompactness is not an obstacle*.

Use of prepositions

WRONG: *We can ~~join a with~~ b by a path π* .

RIGHT: *We can join a to b by a path π* .

WRONG: *..., which ~~contradicts to~~ Theorem 2*.

RIGHT: *..., which contradicts Theorem 2*.

COMMENTS: The verb *contradict* is *transitive*: *to contradict something*, and not “to contradict to something” or “with something”. If you want to use *to* at the end of an indirect proof, you can write: *..., contrary to Theorem 2*.

WRONG: *~~Continuous in the point~~ x*

RIGHT: *Continuous at the point x*

COMMENTS: But of course a function can be *continuous in the set A* (or *on the set A*).

WRONG: *~~Independent on~~ x*

RIGHT: *Independent of x*

COMMENTS: On the other hand, we have: *depending on x*; *independence of $F(U, V)$ from V* .

WRONG: ~~*Disjoint with X*~~

RIGHT: *Disjoint from X*

WRONG: ~~*Then F is equal B.*~~

RIGHT: *Then F is equal to B.*

Then F equals B.

WRONG: ~~*We shall prove this in the end of Section 3.*~~

RIGHT: *We shall prove this at the end of Section 3.*

COMMENTS: *In the end* means finally, as a result of the previous situation, e.g. *Thus in the end, after all these transformations, F will be homogeneous.*

WRONG: ~~*The coefficient by x^3 in the expansion*~~

RIGHT: *The coefficient of x^3 in the expansion*

WRONG: ~~*Then F is greater or equal to 3.*~~

RIGHT: *Then F is greater than or equal to 3.*

COMMENTS: The adjectives *greater* and *equal* require different prepositions: “greater to 3” does not make sense. There are many ways of avoiding this clumsy construction: *F is at least/most 3*; *F does not exceed 3*; *F has no more/fewer than 3 elements*; *F is of degree 3 or less/more.*

Walking in the street, the sun was shining

WRONG: *Setting $x = 0$, the assertion follows.*

RIGHT: *Setting $x = 0$ yields the assertion.*

Setting $x = 0$, we obtain the assertion.

If we set $x = 0$, the assertion follows.

COMMENTS: The subject of a clause containing a participle (here, *Setting*) should be the same as the subject of the main clause (*the assertion does not set anything; we do*). This error is called an *unattached participle* or *dangling participle*.

EXCEPTIONS: “Unattached participles” are normal in some expressions referring to the speaker’s attitude, e.g.

- *Roughly speaking,...* *Considering the proof,...* *Assuming F is continuous,...*

Word order

WRONG: ~~*Theorem 3 we shall prove in Section 4.*~~

RIGHT: *We shall prove Theorem 3 in Section 4.*

Theorem 3 will be proved in Section 4.

COMMENTS: The subject normally precedes the direct object.

WRONG: *We can ~~prove easily~~ Theorem 3 by applying (2).*

We will prove in ~~Section 4~~ Theorem 3.

RIGHT: *We can easily prove Theorem 3 by applying (2).*

We shall prove Theorem 3 in Section 4.

COMMENTS: In general, it is best not to put anything between the *verb* and the *direct object*.

WRONG: *A ~~bounded by 1~~ function*

RIGHT: *A function bounded by 1*

COMMENTS: If an expression qualifying a noun contains a preposition (here *by*), it has to follow the noun.

EXCEPTIONS: This rule is violated by certain expressions which are felt as one word, e.g. *a global in time solution*, previously written with hyphens: *a global-in-time solution*. Generally, any sequence of words joined with hyphens can play the role of an adjective, e.g. *the you-know-which map*; but you can hardly use this stylistic device systematically in a mathematical paper.

WRONG: *The ~~two following~~ sets*

RIGHT: *The following two sets*

WRONG: *Let f be ~~such a function~~ that...*

RIGHT: *Let f be a function such that...*

WRONG: *We now list all the ~~involved~~ functions.*

RIGHT: *We now list all the functions involved.*

COMMENTS: Past participles often appear after a noun, especially if they replace an identifying relative clause: *We now list all the functions that will be involved in our study.*

Other examples where the past participle must appear AFTER the noun: *the process described; the problem discussed/mentioned; the solution obtained/adopted.*

EXCEPTIONS: However, there are many past participles that can appear before nouns, e.g. *an involved explanation* = a complicated explanation (so the word *involved* changes its meaning according to its position); *the stated properties; the above-mentioned problem.*

Wrong word used

WRONG: *This proves the ~~thesis of our~~ theorem.*

RIGHT: *This proves the assertion/conclusion of our theorem.*

COMMENTS: A *thesis* is either a dissertation, or an argument, theory etc. that can be accepted or rejected.

WRONG: *~~To this aim~~, we first consider...*

RIGHT: *To this end, we first consider...*

WRONG: We denote it ~~shortly~~ by A_f .

RIGHT: We denote it briefly by A_f .

COMMENTS: *Shortly* = soon. For example: *A precise definition will be given shortly.*

WRONG: We ~~expose examples~~ of maps such that...

RIGHT: We present/give examples of maps such that...

COMMENTS: *Expose* = uncover, reveal; this word seldom appears in mathematical texts, as opposed to *exposition* = a comprehensive explanation (of a problem): *A detailed exposition is given in [5].*

WRONG: The ~~function f verifies~~ equation (1).

RIGHT: The function f satisfies equation (1).

COMMENTS: In English, *a function cannot verify anything; only a person can.* Note that this construction is normal in French: *la fonction f vérifie l'équation (1).*

WRONG: ~~Contrary to [7],~~ we do not assume the compactness of X .

RIGHT: In contrast to [7], we do not assume the compactness of X .

COMMENTS: The phrase *contrary to* is correctly used e.g. in indirect proofs: *Then $f = 1$, contrary to assumption.*

WRONG: Then $f = 1$, ~~what completes~~ the proof.

RIGHT: Then $f = 1$, which completes the proof.

COMMENTS: On the other hand, you can say: *The function f is continuous; what is more, it is differentiable.* Where lies the difference between these two examples? *Which* refers to what precedes it in the sentence, while *what* refers to what follows it.

WRONG: The function F ~~will be precised~~ in Section 2.

RIGHT: The function F will be made precise in Section 2.
The function F will be specified in Section 2.

COMMENTS: It is tempting to translate the French *préciser* or Polish *sprecyzować* as “to precise”; unfortunately, there is no such word: *precise* is only an adjective.

Miscellanea

WRONG: In this paper we ~~prove among~~ others that...

RIGHT: In this paper we prove among other things that...

COMMENTS: *Among others* can only be used when it is clear what “others” you have in mind, e.g. *Our result generalizes Brown's theorem, among others.*

WRONG: *There exists a limit $\lim_{x \rightarrow 0} F(x)$.*

RIGHT: *The limit $\lim_{x \rightarrow 0} F(x)$ exists.*

WRONG: *~~On the other side~~, F fails to have property P .*

RIGHT: *On the other hand, F fails to have property P .*

WRONG: *~~As usually~~, we can rephrase this as a uniqueness theorem.*

RIGHT: *As usual, we can rephrase this as a uniqueness theorem.*

Punctuation

WRONG: *We ~~prove, that~~...*

RIGHT: *We prove that...*

WRONG: *Let f be any function, ~~which~~ satisfies condition (1).*

RIGHT: *Let f be any function which satisfies condition (1).*

COMMENTS: Do not put a comma before a “defining *which*”. On the other hand, put a comma before *which* if it starts a non-identifying clause; a typical example appears at the end of a proof: *Then $f = 1$, which completes the proof.*

WRONG: *~~Let $n \in N$, then~~...*

RIGHT: *Let $n \in N$. Then...*

WRONG: *This case has been thoroughly ~~studied, see~~ [2, 3, 8].*

RIGHT: *This case has been thoroughly studied (see [2, 3, 8]).*

This case has been thoroughly studied; see [2, 3, 8] for more details and examples.