A Small Guide to Avoid Mistakes in Writing Technical Papers

by Michael Aufmkolk, January 1998

<u>**Contents**</u>   Page

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1. What tenses are to be used in if-sentences?

One of the most difficult problems seems to be to decide on the correct tenses in if-sentences. In order not to confuse you I only consider the case where you use the Present or Present Perfect in the if-clause. Compare the following examples.

If-clause	Main-clause
(1) If Tim leaves immediately,	he will catch the 6.30 train.
(2) If you see Jeff tonight,	ask him to ring me up.
(3) If you are feeling sick,	you should go to bed.
(4) If Dick hasn't booked his holiday yet	he will have porblems to get a hotel.
(5) If the petrol tank is empty,	the car does not start.
(6) If you throw a stone into a river,	the stone sinks to the bottom.

In if-clauses of this type the speaker announces the presuppositions or conditions on which something will happen, can happen, should happen etc.

In his mind the presuppositions or conditions are possible in the future, present at the moment, or they already were fulfilled (or not) in the past.

If the conditions or presuppositions refer to the future, you use Simple Present in the if-clause (1), (2). If the conditions or presuppositions refer to an on-going process, you use Present Progressive in the if-clause (3). If the conditions or presuppositions refer to something that already happened, you use Present Perfect in the if-clause (4). In all these sentences you use the **will-Future** (1), an **Imperative** (2), or a **Modal Auxiliary** (3), in the main clause.

However, if you want to express that under the same presuppositions or conditions always the same will happen, then you must use **Simple Present** in the main clause, too ((4) and (5)). „If" in this context stands for „whenever".

The main problem is to decide whether the sentence you are using belongs to the first or to the second category, in other words, whether you have to use the **will-Future**, an **Imperative**, or a **Modal Auxiliary** ((1),(2),(3)), or **Present Tense** ((4),(5)) in the main clause.

So when using the if-sentence think hard whether you want to express a rule and an ever-reoccurring situation or a concrete presupposition or condition. A good way to always remember the difference is the following example:

If it rains tonight, the streets will be wet tomorrow. (concrete situation)
If it rains, the streets are wet. (common rule)

Please note another simple rule in connection with if-sentences. Whenever the if-clause occurs first, the main clause follows separated by a comma. Whenever the main clause occurs first, the if-clause follows without a comma.

If Tim leaves immediately, he will catch the 6.30 train.
Tim will catch the 6.30 train if he leaves immediately.

2. How to build and where to place the adverb?

Building the adverb should not be such a big problem. Most adverbs in English are derived from adjectives by the addition of *-ly (quick-quickly, careful-carefully, etc.)*. Some famous exceptions, however, are certain adverbs that have exactly the same form as adjectives:

ADJECTIVE	ADVERB
An early train	The train arrived early.
A hard task	We tried hard to convince him.
A late dinner	I have been working late.

(Notice the different meaning of *lately = recently* and *hardly = „kaum".*)

The problem, however, is not particularly how to build the adverb, but when to use it. Most of you even know these rules, but unfortunately you often simply forget to apply them. Hence, once again the rules in short:

Whenever a word modifies a verb (1) <u>or an adjective</u> (2) <u>or an adverb</u> (3) it takes the form of an adverb.

Please notice the following examples:

(1) The algorithm performs well in this surrounding.

(2) A <u>particularly good</u> way to solve the problem is the following algorithm.

(3) The algorithm performs <u>particularly well</u> in this surrounding.

Quite often you forget about the cases (2) and (3).

Still we have not considered the most frequent mistake with respect to the adverb, which is the question where to place the adverb in a complex sentence. In order to understand the subsequent rules, one has to bear in mind the following distinctions. There are adverbs of manner, adverbs of degree, adverbs of time, and adverbs of place. Further one distinguishes three positions of the adverb:

front-position   *Now* Susan is very happy.

mid-position	Susan is *now* very happy.
end-position	Susan is very happy *now.*

Please note that the adverb in the mid-position always follows the first auxiliary.

Susan has *now* been happy for a long time.

She might *never* be unlucky again.

Only for negative or positive emphasis the adverb might occur in front of the auxiliary and this usually only in spoken language.

I *still* don't subscribe to Leighton's way of solving the problem.

I *really* will tell him my opinion next time.

The following rules can only describe the most frequent use of the different adverb classes. For reasons of emphasis or complexity (i.e. very long and complex sentences), adverbs show a very high and thus difficult mobility.

2.1 Adverbs of manner

Adverbs of manner describe *how*, *by which means* or *in what way* something is carried out. Adverbs of manner usually have end-position:

The algorithms performs well.

They examined the specimen microscopically.

He spoke silently.

The vector c is defined correctly.

This also holds for subordinate clauses in complex sentences:

Although the algorithm performed *well*, the drawback of the problem has not been solved *sufficiently* in respect to its characteristics mentioned above.

The main clause of this sentence also displays a crucial problem. According to our rule defined above *sufficiently* should be placed at the end of the sentence. Grammatically speaking, however, a clause is complete as soon as a part of it builds a sensible unit. The smallest sensible unit of the main clause is „the problem has not been solved". Therefore we can conclude that adverbs of manner in a complex sentence usually should be placed at the end of the shortest sensible unit.

2.2 Adverbs of place

Adverbs of place, both those denoting location and those denoting direction, usually have end-position. Commonly, there are no place adverbs built by *-ly* but they belong to the following group *here, there, somewhere, anywhere, everywhere, nowhere* or a prepositional phrase is used (*in London, at the wall, outside the house, etc. (in, at, outside... are prepositions).*

> The meeting will be held *upstairs.*
>
> He managed to kick the ball *into the goal.*

This rule should not be taken as a strict law, though. Front-position is also quite frequent.

> (1) The boys were playing chess outside.
>
> (2) Outside, the boys were playing chess instead of soccer.
>
> (3) The children were playing in the nursery.
>
> (4) In the nursery the children were playing happily but noisily.

(Please note the different emphasis, the key information in (2) and (4) is at the end of the sentence, which is the reason for the front-position of the adverbs of place. When adequate, please use this construction in your papers, too.)

2.3 Adverbs of time

Generally, there are three classes of time adverbials: time-when adverbials, time duration adverbials, and time frequency adverbials. One may distinguish two groups of time-when adverbials, where the first group denotes a point or period of time and normally has end-position:

> We lived in Baltimore *last year.*
>
> The meeting starts *tomorrow at 8 o'clock.*

Group B adverbials denote a point of time but also imply the point from which that time is measured. These adverbials can occur in all three positions.

> *Once* we owned a dog.
>
> We owned a dog *once*.
>
> We *once* owned a dog.

Time duration adverbials on the other hand normally have end-position:

> I will be in California *for the summer.*
>
> They were working on the paper *all night long*.

I have been staying here *since last Saturday.*

Single-word duration adverbs, however, usually take mid-position:

They have *always* tried to be friendly.

The PC is *temporarily* out of work.

Time frequency adverbials can be divided into two classes again, those denoting definite frequency and those denoting indefinite frequency. Definite frequency adverbials usually have end-position.

Class meetings take place *weekly.*

This week I will be in the office *every day.*

On the contrast, indefinite frequency adverbs usually have mid-position.

He *generally* leaves home at seven in the morning.

I do not *usually* go to bed before midnight.

I am *rarely* in my office after five.

2.4 Adverbs of degree

Degree adverbs have a heightening or lowering effect on some part of the sentence. Many of them occur in mid-position:

This problem has *definitely* been discussed exhaustively.

We *thoroughly* disapprove these methods.

The algorithm *scarcely* solved the problem.

Two or more adverbials

When more than one of the main classes of adverbials occur in end-position, the normal order is manner + place + time.

He definitely was working hard in the garden the whole morning.

3. Sentence Structure

First of all, some general remarks. German sentences tend to be longer than English ones. Hence, English sentences should not to be too long or complicated („It makes them appear German!" if I may quote an English friend of mine). This does not mean that in English one cannot build long and complicated sentences at all, but very often simply dividing long sentences into several smaller ones helps avoiding mistakes. This will not effect the scientific and formal tone of your paper.

The simplest but still valid rule concerning sentence structure is S+P+O, meaning Subject + Predicate + Object. If you add an adverbial, keep in mind „place before time", i.e., always place the place adverbial before the time adverbial:

> The algorithm returned good results inside this setting in previous runs.

Another frequent mistake occurs when you try to reduce subclauses with help of the participle. This is usually no problem, if you reduce relative-clauses.

> The girl who is wearing white jeans is called Anne.
> The girl wearing white jeans is called Anne.

However, please notice that the participle always defines the preceding noun, which does not have to be the case in German. Therefore you have to be explicit in order to avoid ambiguities.

> (1) German: <u>Mark</u> bemerkte den Mann, als <u>er</u> den Raum betrat.
> (2) Wrong English translation: Mark noticed the <u>man entering</u> the room.
> (3) This would mean: Mark noticed the <u>man </u>who was <u>entering</u> the room.
> (4) Correct English translation: <u>Mark</u> noticed a man when <u>entering</u> the room.

The same holds for the reducing of adverbial clauses:

> (1) <u>Algorithmus A</u> ist besser geeignet als Algorithmus B, da <u>er</u> parallel arbeitet.
> (2) Wrong: Algorithm A performs better than <u>algorithm B running</u> in parallel.
> (which means that algorithm B would run in parallel)
> (3) Correct: <u>Running</u> in parallel, <u>algorithm A</u> performs better than algorithm B.

In English the decisive aspect is the space between the participle and its defining noun. Thus be careful that there is no other noun between the participle and the noun you want to define. Further notice that a reduced adverbial clause built with the participle <u>without</u> a conjunction

can only have temporal or causal meaning. In all other cases you should use the corresponding conjunction, which in particular holds for instrumental connotations (How?, By which means?).

Indem wir diesen Algorithmus benutzen, kann das Problem gelöst werden.
Wrong: Using this algorithm the problem can be solved.
This means: When using this algorithm the problem can be solved. or
As this algorithm is used the problem can be solved.
Correct: By using this algorithm the problem can be solved.

3.1 A few tricky participle constructions

Er hörte auf zu essen.

He stopped eating.

He stopped to eat.

Er hielt an, um zu essen.

Das Programm lief weiter.

The program went on running.

After informing the user,the program goes on to balance the load.

Nachdem der Benutzer informiert wurde, verteilt das Programm als nächstes die Last.

Er versuchte, die Tür zu öffnen.

He tried to open the door. (try + infinitive = versuchen)

He tried opening the door with a credit card.

(try + gerund = ausprobieren)

Denken sie daran, das Problem mit Hilfe von Millers Algorithmus zu lösen

Remember to solve the problem with Miller's algorithm.

Remember solving the problem with Miller's algorithm.

Erinnern sie sich, wie wir das Problem mit Millers Algorithmus lösten.

3.2 Constructions requiring the -ing form

adjust to	consist of	pay for
admit	decide against	place for
advantage of	delighted about	possibility of
afraid of	depend on	problem in
agree with	disappointed about	reason for
alternative of	experience in	reject
angry about	famous for	specialize in
apologize for	finish	spend time on
appreciate	give up	suggest
ask about	imagine	take part in
avoid	impressed with	talk about
begin by	include	trouble in
choice between	interest in	used to
clever at	method of	useful for
complain about	mention	way of
concentrate on	miss	
consider	necessary for	

4. A few Comments on Style

When writing technical papers it is obvious that you should use a formal and scientific style. A characteristic of formal written English as well as of formal written German is impersonality. So you should avoid to address the reader directly by preferring passive instead of active constructions (e.g. instead of „...as you can see in Fig. 1" „as can be seen in Fig. 1". However, do not make excessive use of the passive, particularly when explaining something in detail. In English, short active sentences are a sign of detailed descriptions. Sometimes the Imperative can be very helpful. For example: The result is straight forward. First compute the solution of equation 1. Then implement the result in equation 2. Use these two results to get a solution for x. Now replace x in equation 3 ....Instead of: The result can be achieved straight forward. First the solution of equation 1 should be computed. This result should then be implemented in equation 2...

Another difference concerning style is the placement of the decisive information within a sentence. In German the important message usually occurs in the beginning of a sentence. In English it is often just the other way round.

> <u>Lange Laufzeiten</u> haben somit keine Auswirkungen auf das Ergebnis.
>
> Thus the result cannot be effected <u>by long running times</u>.

Another sign for formal language in German are long modifications before a noun, e.g.

> <u>Auf dem Mond aufgenommene Photos</u> wurden zur Erde gesendet.

A proper English translation, however, is:

> <u>Photos taken on the moon</u> were transmitted to the earth.

In English the modification ought to appear after the noun. With participles there even exists the following rule for formal English: If only one participle describes a noun, it is placed before the noun. If the participle is enhanced in any form, the construction has to follow the noun.

> Compare: The mentioned article...
>   The article mentioned in chapter 4...

However, short and idiomatic constructions may still appear before the noun:

> The above mentioned article...(Correct, but „The article mentioned above...“
> is more formal.)
> The well-known solution...
> The ill-structured essay...

In the following, I shall list a few very simple aspects that should be kept in mind when writing a formal paper.

1. Never use „But“, „And“, or „Because“ at the beginning of a sentence. Use „However“, „Since“ or „As“ instead.

2. Never use „a lot of“ in formal written English, use „many“ instead.

3. Avoid any constructions occurring only in spoken language, such as isn't, doesn't, won't, you're, he's etc.

4. Try to avoid informal language. E.g. replace „by the way“ by „incidentally,

5. On Punctuation

The most problematic punctuation mark in English (as in German) is probably the comma. However, you should notice a major difference. In English the comma is rather a question of

style than of grammar. Whereas in German there are strict rules and a comma usually is absolutely necessary or not, in English you do not have a strict catalogue for comma rules. So sometimes a comma may be placed in order to show that a new line of thought begins in a sentence, other times a comma may be left out in order to show the connections between two thoughts. However, there are still some rules you should bear in mind:

Whenever an enumeration includes more than two items, use a comma before „or" and „and".

      All you need to be happy is friends, family, and money.

Whenever the if-clause occurs first, the main clause follows separated by a comma. Whenever the main clause occurs first, the if-clause follows without a comma. (see if-clauses above)

Non-defining relative clauses must be separated by commas:
Our neighbor, who works in London, likes big cities.
We spent our last holidays in Brighton, which is a famous resort.

The parts underlined in the sentences carry unnecessary (non-defining) information. Therefore the sentences will still make sense, if these parts are left out. Any information of this kind should be separated by using commas. A basic rule is that if a sentence can still be grammatically correct and make sense without a phrase, that phrase should be distanced from the main clause by use of a comma.

Juergen Klinsmann, an old soccer player now, once was a supreme goal getter.

Another problem is the use of the period in abbreviations. First you should decide on one of the following forms: e.g., eg, (exempli gratia, for example), ie, i.e.(id est, that is, this means), viz., viz (videlicet, namely). Then you should stick to that form throughout your paper. Whenever a complete sentence follows after e.g. or i.e. you should also add a comma to the abbreviation:

      The problem is not easy to solve, i.e., there are many further aspects to consider.

      The President, i.e. not the Secretary of State, is responsible for the crisis.

      One may choose many colors, e.g. red, blue, or green.

      One may choose many colors, e.g., a very nice choice for the car is blue.

6. On Orthography

A frequent problem is the use of both American English (AmE) and British English (BrE) in the scope of the same paper, which should be avoided, of course. For consistency you should stick to one form only. Note the following list:

AmE	BrE
behavior	behaviour
color	colour
neighbor	neighbour
analyze	analyse
program, programs	programme, programmes
center	centre

In addition, sometimes two correct spellings coexist. Again for consistency, stick to one only.

analog, analogue (noun)

graphic, graphical, (adjective)

systematic, systematical,

modeled, modelled

acknowledgement, acknowledgment

fulfil, fulfill, but always fulfilled

Another problem is the use of the indefinite article in front of abbreviations, in other words whether to use „an" or „a" before single variables like n, m, or l. Indeed, this should not be a problem at all, since the following rule holds. Whenever in the actual pronunciation the indefinite article is followed by a consonant, you have to use „an" instead of „a", regardless whether in the actual orthography a consonant appears or not. So it has to be

an n, an m, an x, an h, an f etc.

Hence, when reading aloud the definite article you should also say „thi" n, „thi" m, etc.

7. On the use of the tenses

The most problems occur when you are describing facts and results that were established at different time periods. Compare the following example.

(1) In 1989, Smith et al discovered a solution for the problem mentioned above. (2) Before, Miller in his essay on the same subject had proven that a solution for the simple hypercube (3) must exist. (4) Miller works on the assumption that for all x a solution is possible, however big the radius may be. (5) Smith et al. extend this result by defining a valid solution for the butterfly network, too. (6) So far, we have not been able to solve Theorem 1. (7) In the following, we will/shall/can use their results to prove Theorem 1.

In sentence (1) you have to use Simple Past, because with the definite time reference (In 1989) you are refering to a definite point of time in the past (Vollendete Vergangenheit). In (2) you have to use Past Perfect, since you are refering to something that had happened before this definite point of time (Vorvergangenheit). In (3) you have to use Simple Present, since you are refering to a proven law that is / was and will always be existent. In (4) you have to use Simple Present, since you are refering to a written text. Contents and information out of written texts should be repeated in Simple Present. The same holds for (5), even though Miller (before1989) and Smith (in 1989) work on different time levels. In (6) we have to use Present Perfect, since we do not refer to a definite point of time in the past but to a period of time that started in the past and continues to the present (So far). (7) should be straight forward. Notice that the will-future can often be replaced by a modal auxiliary. To me in (7) „shall“ sounds the most idiomatic.

If in doubt, you might want to use the following diagram to solve the problem. For detailed information, however, you should use a school grammar.
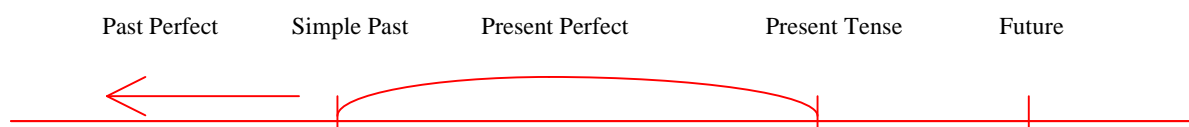
For the problems arising within the scope of your use of English, I still recommend Cornelsen's English G Grammatik, which should suffice to solve the most frequent problems.

8. Useful words and phrases

In the following there is a list of useful words and phrases you might want to use in your essays. There are some useful words to begin, end, or continue the argumentation, some „false friends" (e.g. eventually), and other tricky words often misspelled. Further the list will help you to vary your vocabulary. Sometimes your paragraphs are built in a very monotonous structure. (First...Then...Finally...).

allgemein	In general
Analyse, Analysen	analysis (Sg.), analyses (Pl.)
anders gesagt	In other words
Außerdem	besides
..., denn sonst...	..., since then...
beziehungsweise	respectively (nachgestellt: a and b respectively)
Daher	Hence,...(gebraeuchlicher als therefore)
Das entscheidende Problem	The crucial problem
Das problem ist längst noch nicht gelöst	The problem is far from being solved
Der Algorithmus setzt sich auf diese Art und Weise fort	The algorithm continues in like fashion
Der Einfachheit halber	For reasons of simplicity
Die bestmoeglichste Lösung	The best solution possible
Die Beweise können im Anhang nachgelesen werden	For the proofs we refer the reader to the appendix.
Die denkbar beste Lösung	The best solution conceivable
Die gesamte Produktion,etc.	The overall production
Die wesentlichen Probleme	The substantial problems
Diese Gleichung stellt ein ernstes Problem dar	This equation is a stringent constraint
Eine einfache Loesung	A straight forward solution
Ein ungelöstes Problem	A problem still unsolved
Eine unbeantwortete Frage	One question still unanswered
Es ist denkbar	It is conceivable, conceivably
Es genügt zu zeigen	It is sufficient to show
Es ist wahrscheinlich	It is likely
Etwas ist wert, untersucht zu werden	sth. is worthy of study

Eventually   schliesslich, endlich und eben nicht #eventuell

eventuell   probably, possibly. Häufig erfüllt auch ein eingeschobenes 'might' den Zweck.

Für den rest des Textes   Throughout the paper...

                               For the remainder of the text

genauer gesagt   strictly speaking

Gerade aufgrund dieser Tatsache   =It is because of this fact

groß   use great for describing quality, use big or large for describing quantity

                               e.g.: great efficiency, big/large amount

größtenteils   for the most part

Haupt-   key problem, key idea

Im folgenden Schritt   In the subsequent step (instead of always "In the following step)

Im folgenden   In what follows

Im Verlauf   In the course of

Im vorigen Abschnitt   In the preceding paragraph

                               In the previous paragraph

                               In the paragraph before

In der Tat   Indeed, (haeufig gebrauchtes Fuellwort)

Informationen   bits or pieces of information („informations" is wrong)

In jedem zweiten Schritt   every other step

Krise, Krisen   crisis, crises

Kriterium   criterion, criteria

Man sollte beachten, daß   It is worth noting that

...nämlich   namely, viz.

Nachdem wir nun bewiesen haben... Now that we have proved

Schwerpunkt   key importance, key point, focus

Über das Thema wurde schon viel geschrieben   There is a vast literature on the subject.

Übrigens   incidentally

Um eine möglichst hohe Effizienz zu erreichen   In order to attain the greatest efficiency

Um die Schreibweise zu vereinfachen   For simplicity of notation

Um es kurz zu fassen   For abbreviation, In short, To put it in a nutshell

Von hieran   Henceforth,

9. Words hard to pronounce

Der betonten Silbe geht ein ' voraus

adjacent	=e'dscheysent
applicable	='eplicebl
arithmetics	=a'rithmetics
bisection	='beisection
finite	='Feineit
infinite, infinity	='infinit
integer arithmetic	= 'intedsche e'rithmetic
isoperimetric	='eise'peri'metric
matrix	='meytrix
pivot	='piwet
product	='prodakt
request (n)	=re'quest
request (v)	='request
subtlety	='satlti (Spitzfindigkeit, Feinheit)
subtle	='satl
suffice	=se'feis
routing	='ruting
theorem	='thierem

10. Empfehlenswerte Referenzwerke

English G Grammatik, Cornelsen, Berlin Neudruck 1997

Diese Grammatik wird vielen von euch schon zu Schulzeiten begegnet sein, (es ist der 7. Neudruck der 2. Auflage von 1981) sie ist jedoch nach wie vor empfehlenswert, da sie durch ihre Einfachheit und Klarheit hervorsticht.

G. Leech, J. Svartvik   A Communicative Grammar of English, Longman Group, 1975

Eine englische Grammatik, die vor allem auch Auskunft über Stilfragen gibt. Um gut damit arbeiten zu können, solltet ihr die Einleitung und das Kapitel „Varieties of English" lesen.

R. Quirk, S. Greenbaum et al.   A Comprehensive Grammar of Contemporary English, Longman 1991

Das englische Gegenstück zum deutschen Duden, sehr umfassend und ausführlich, jedoch verlangt das Werk gute Vorkenntnisse.

Als gut geeignetes Lexikon für American English (aber auch die Schreibweisen in British English sind enthalten) empfehle ich **Webster's New World College Dictionary.**

Als schnelles jedoch fehlerhaftes On-line Dictionary empfehle ich das der TU-Chemnitz:
    http://www.tu-chemnitz.de/urz/netz/forms/dict.html
(wirklich nur als schnelles Nachschlagewerk, andere On-line Dictionaries sind über die HomePage der AG Monien zu erreichen, konnten aber nicht mehr ausführlich geprüft werden).