

# Guide for writing technical reports and papers

a short-list compilation from the best sources  
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*The motto of scientific writing is  
brevity and clarity,  
that is, to provide  
maximum information with  
minimum words in  
a well-organized manner.*

*Think-plan-write-revise-wait-revise-publish*

*Writing helps you to remember  
Writing helps you to observe  
Writing helps you to think  
Writing helps you to understand*

*Practice writing  
Writing is deleting*



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**1. PREPARATION**

1. Make notes during an experiment.
2. Keep a day-to-day record of your work in your logbook.
3. Keep full bibliographic details of every relevant reference consulted, preferably in an electronic database.
4. Prepare notes on each observation or experiment as it is completed.
5. List points arising from your work and from relevant work by other people so that you will remember these when you are ready to write the report or paper.
6. When your work is complete prepare a detailed topic outline.
7. Consider whether your work should be published. If there are new findings, should your report be published as a whole or in part? Should it be published as one or more papers?
8. If necessary, revise the topic outline(s).
9. Consider carefully which journal(s) your paper(s) would fit into most appropriately.
10. Read the "Instructions to Authors" for the journal.
11. If necessary, revise the topic outline to ensure that your paper conforms to these instructions.



## 2. ARRANGEMENT

According to ISO and ANSI standards

Short explanation on this section:

The conclusion is often put before the main body. The reasoning is that most readers are interested in the results. Actually, what is missing is a proper summary. If the summary is added with the proper content then the primary objectives are met. Note that a summary differs from a conclusion!

The content of a report has been outlined to the left. The content for a paper has been outlined to the right.

**REPORT****PAPER**

Front cover

Title Page

Author and affiliation

Summary

Abstract (optional)

Preface (optional)

Table of Contents

Introduction

*Materials, methods and results:*

Theory (additional to or alternative to next section)

Experimental procedure and results

(with sub-headings)

Evaluation

Conclusions

(must be precise, orderly, clear and concise)

Recommendations (arising directly from the conclusions)

Acknowledgements

List of references

Appendices

Tables (if not included in the main body of the text)

Illustrations (see above)

Graphs (see above)

Literature survey (if necessary)

Bibliography (supplementary to list of references)

Glossary (if necessary)

List of abbreviations, signs and symbols (mandatory)

Index (if necessary)

Distribution list (if required by the sponsor or house rules)

Document control sheet (see above)

Abstract card(s) (see above)

Back cover

Title

Author and affiliation

Abstract

Introduction

Theory

Experiments

Evaluation/

Conclusion

List of references



### 3. WRITING

Make a structure of your report before starting to write. The structure contains the hierarchical partitioning of your text in chapters, sections, etc. with keywords for each partition.

1. Formulate the preliminary **Title**.
2. Phrase precisely a clear statement of the problem in the **Introduction** section.
3. Compose a provisional list of **Contents**, with headings and sub-headings, before you start to work. This will help you to create an orderly arrangement of information and to prevent repetition.
4. Revise the **Contents** each time you add or delete something.
5. Write the **Materials & Methods** section as soon as your procedure has been established and any initial difficulties have been overcome.
6. Write the preliminary **Results** section.
7. Make a note in the preliminary text where to put tables, drawings, diagrams and graphs, with effective headings and legends.
8. Do not try to achieve perfection directly. Write a "quick and dirty" version of the text based on the structure that you have designed, and refine the text iteratively.
9. Notes on points to be included in the **Conclusion** can be assembled throughout the work.
10. Complete the **Introduction**.
11. List the **References**.
12. Write the first complete draft.
13. Revise the first complete draft.
14. Ask two people to read the second draft and then revise the paper in the light of their suggestions.
15. Check that publication is acceptable to your employer and that nothing to be published is classified as confidential or secret.
16. Obtain written permission to use any copyright material.
17. Read all the references cited in the text again to make sure that the work of others is correctly represented and that the bibliographical details are correct and complete.

18. Make sure that everything in the manuscript is in the right place.
19. Check the typescript.
20. Obtain clearance for the corrected typescript from your supervisor, head of department, or employer, as appropriate.

## **4. FRONT MATTER**

The front matter precedes the text and pertains more to the bibliographical facts of the paper than to the actual research. Front matter consists of the title page, the summary (for a report) or abstract (paper), a table of contents (for reports), and a list of key words for indexing.

### **4.1. TITLE**

The title should be brief but unambiguous, and it should give a clear indication of the subject and scope of the work.

- Choose a title that will attract the reader's interest
- Use the fewest possible words to adequately describe the content of the paper.
- Be specific.
- Avoid abbreviations, except standard ones.
- Avoid subjective terms (novel, innovative).
- Delete superfluous words (for example: "Aspects of...", "Neglected effects of...", "Studies on ...part...").
- Put important terms at the beginning of the title.
- Re-consider the title at the end.

### **4.2. AUTHORS AND AFFILIATIONS**

- Include only those who have contributed materially to the research project.
- List order depends on each author's role and contribution.
- Write names in western format: given names followed by family name.
- List the affiliations of all authors.
- List the corresponding author, the address to which correspondence should be directed, telephone number, facsimile (fax) number and electronic mail (e-mail) address.

### **4.3. SUMMARY (FOR REPORTS)**

Great care is needed in the preparation of the summary because, after the title, this is all that most readers will see. It must be complete, interesting and informative without reference

to the rest of the report, except that information given in the title should not be repeated.

The summary shall comprise:

1. Objective: formulation of the problem
2. Methodology: materials and methods
3. Results
4. Conclusions

Some suggestions in writing the summary:

- The summary can be written only when the report is otherwise complete.
- Write in straightforward non-technical language, so that all people for whom the report is intended can understand the summary.
- The summary should be in the third person.
- The summary should be in complete sentences.
- The summary should be as short as possible.
- The problem that you have investigated should be stated.
- The methodology you have chosen should be mentioned.
- When experiments are reported the methods used should be mentioned.
- For new methods, the basic principles, range of operation, and degree of accuracy should be given.
- State the main findings in the same order as in the report.
- Give a synopsis of the main conclusions and an indication of their range.
- Everything new and everything you particularly want people to know must be mentioned.
- There should be no information, ideas or claims other than those in the report.
- No table numbers, figure numbers, references, abbreviations or citations should be included.
- The length of a summary is approximately 1-1.5% of the full report. For a 100 page report 1 to 1.5 pages.
- Ask someone who has not read your report to read and comment on your summary.

#### 4.4. ABSTRACT (FOR PAPERS)

The main function of the Abstract is to help the reader decide if he/she wants to read the document. A good abstract will tell the reader what he will find in the documents and, if possible, also what he might reasonably expect to find but will not.

It is something completely different than the summary. The main objective of the abstract is to attract people. The main objective of the summary is to inform the fast reader about the work performed.

An abstract is on its own, without reference to the paper. It covers

1. Objective: formulation of the problem
2. Methodology: materials and methods
3. Results
4. Conclusions.

An abstract contains between 50 and 250 words. Citing references is not allowed.

#### 4.5. PREFACE (OPTIONAL FOR REPORTS)

- Mention the context of your project (e.g. if it is part of a larger cooperation between the group and a certain company).
- Thank those people that have helped you during your project.

Note: If thanking is the only purpose of the preface, it is better to do this in the Acknowledgment part, just before the List of references.

#### 4.6. TABLE OF CONTENTS (REPORTS ONLY)

The table of contents in a report is a list of the

- chapters (1, 2, etc. followed by the name of the chapter),
- sections within chapters (1.1, 2.4, etc. + name) and
- subsections within sections (1.1.1 + name)

and the page numbers where they start. Furthermore you have to list the

- appendices (A, B, etc. + name)

and other entities like the

- preface and
- references (the so-called unnumbered chapters').

Do not include the

- summary and the
  - table of contents itself
- in the table of contents.

#### **4.7. KEY WORDS**

- Provide several words or phrases for the benefit of the indexer.
- Include words that are not part of the title of the paper.

## 5. **MAIN BODY**

The organization of the main body of a scientific paper is represented by the acronym **IMREC**, which stands for:

**Introduction:** What problem was the research project addressing?

**Materials and Methods:** How did you study the problem?

**Results:** What did you find?

**Evaluation:** How do you explain the findings?

**Conclusion:** What do the findings mean?

An engineering report might have:

Design Considerations,  
Manufacturing Process,  
Field Trials,  
Analysis and Evaluation of Data,  
Conclusions.

### 5.1. INTRODUCTION

*What did you do, why.*

The introduction contains information that should be read before the rest of the text. Its purpose is to provide the educated reader with specifics needed to understand the paper. Essentially, the introduction covers three parts:

1. The general background (context), with
  - the reason for undertaking the project (for a report only) and the
  - nature and scope of the problem.
2. A brief summary of previous findings (by others).
3. The examination of the questions addressed.

A description of the structure of the rest of the report, indicating which chapter will address which issue, is needed for reports.

### 5.2. MATERIALS AND METHODS (EXPERIMENTAL PROCEDURES)

*How did you study the problem*

This section describes and justifies your approach to the research problem. The number of chapters you need and their contents strongly depend on your project.

Remember that a good reviewer will read this section to judge the validity of your approach.

- Include enough detail to ensure that if the investigation is repeated by someone else, with experience in the same field, similar data could be obtained.
- You can assume the reader to know what you already knew before starting to work on the project.
- Present issues that are not strongly related in separate chapters with well-chosen names.
- Summarize the literature. Present your own interpretation of the theory instead of literally copying text.
- Present the theory that is necessary to understand what you have done.
- List the equipment used and draw anything that requires description (unless this is very simple).
- If necessary, refer to preliminary experiments and to any consequent changes in technique. Describe your controls adequately.
- State the conditions of the experiment and the procedure, with any precautions necessary to ensure accuracy and safety.
- Do not include results in this section, except in a methodology paper, in which the methods become the results.
- Use internationally accepted names of the materials used.

### 5.3. RESULTS

#### *What did you find*

This section is the meat of a paper, presenting the findings in text, illustrations, and tables. This does not, however, mean that the Results section should be lengthy.

- The section should be written in the past tense.
- Do not start the Results section by describing methodology.
- Report significant results only.
- Use different chapters if this is logically justified.
- It should provide a factual statement of what you observed supported by any statistics, tables or graphs derived from your analysis of the data recorded during your investigation.
- Avoid redundancy: Numerical values that are apparent in illustrations and tables should not be duplicated in the text.



- Cite figures and tables concisely: Do not include the same data in both figures and tables and do not repeat the legend of a figure or the title of a table in the text.
- Bear in mind that text in figures and tables must be legible after reduction by the printer. Colors are nice but costly to reproduce.
- Describe representative successful experiments in detail; and it may be helpful to mention briefly the unsuccessful experiments and wrong turnings which are part of every investigation.
- Present your results in a logical order (not usually the order in which you did the work).
- Remember that this is not the place for your comments.

#### **5.4. EVALUATION AND CONCLUSION**

*Your interpretation of results, what do the findings mean.*

This is usually the most challenging section to write. It is not a recapitulation of results. The value of the evaluation lies in your interpretation of the findings, the valuation of their significance and an examination of the implications. The evaluation shall end with a conclusion. The conclusion contains the answers to the questions mentioned in the introduction.

- New results should not be introduced in this section.
- References to what you did should be written in the past tense to emphasize that you are commenting on the work reported; but write statements of fact in the present tense.
- Present the principles, relationships, and generalizations shown by the results.
- Point out any exceptions or any lack of correlation, and define unsettled points, but avoid focusing on trivial details.
- Show how your results and interpretations agree or disagree with published work.
- Say how your work fits into the background of previous investigations; but claim no more than you can substantiate.
- When writing, take care to make your meaning clear. Anything ambiguous is likely to be misunderstood.
- Discuss the theoretical implications and any possible applications of your findings and interpretations.

- State your conclusions.
- Summarize your evidence for each conclusion.
- Point out the issues recommended for future research.

## **6. BACK MATTER**

The back matter follows the main body and lists resources that were not part of the research project but nonetheless contributed to its execution. These include research contributions, sources of funding, and reference materials.

### **6.1. ACKNOWLEDGMENT (OPTIONAL)**

The main purpose of this section is to credit those who have made significant research contributions to your project. Another important function of this section is to mention individuals and entities that have provided essential support such as grants and fellowships. The Acknowledgement is not common practice in papers.

### **6.2. LIST OF REFERENCES (MANDATORY)**

This section contains the cited (significant) published references only. Do not list any entries to which you do not refer from the text. If you really want to list this type of entries, make a separate list without labels and put this list in the Bibliography. Be always fair when making use of somebody else's work. Never copy a text, idea or figure without referring to the source. Even when you mention the source, try to limit the length of literal citations to at most one or two sentences. Longer citations will give the impression that you are unable to formulate an idea in your own words.

Follow the journal's instructions for documentation, which will be some version of the author-date system, the number system, or a combination of the two. Otherwise use the instructions described hereafter.

- Each entry in the list of references has a numeric label.
- The numbering is in the same order as the citations are made in the report or paper.
- Any reference from the main text to the entry should use this label.
- The label shall be enclosed in square brackets.
- The details of each entry, sorted by label, shall be given in the List of references.

- For a book: name of the authors, title, publisher, city of publication and year of publication.
- For an article in a journal: name of the authors, title, name of the journal, volume number, issue number within a volume, range of pages, and year.
- For an article in conference proceedings: name of the authors, title, name of conference, editors (if present), range of pages and year.
- For a chapter in a book: authors of the chapter, title of the chapter, editors of the book, title of the book, publisher, city of publication, range of pages, and year of publication.
- For a report: authors, title, university/company, report number, year.
- For a Ph.D. or Master's Thesis: author, title, university, department, year.
- For a manual/handbook: company name (if there are no authors), title, reference number, year.

### 6.3. APPENDICES (ONLY IN REPORTS)

Appendices are useful for those things that you consider important, but that do not fit in the main presentation of your work.

A list of abbreviations, signs and symbols is mandatory.

A list of figures and a list of tables can be made but is less important than the abbreviations list, thus should be placed in the appendix too.

The lists are in numerical and alphabetical order. The list of signs and symbols starts with arabis and ends with the greek symbols, i.e.  $a, A, b, B, \dots \alpha, A, \beta, B, \chi, X$  etc.

A vector is in plain style. A matrix is in plain-bold, while units are in italic. Numbers are always in plain style.

### 6.4. BIBLIOGRAPHY (OPTIONAL)

The bibliography is supplementary to the list of references.

**7. CHECK LIST FOR AUTHOR**

1. Is the title page complete?
2. Does the title provide the best concise description of the contents of the report?
3. Is the Contents page still needed? If so, are the headings the same as those used in the report?
4. Is the use of headings and sub-headings consistent throughout the report; are the headings concise; and are all the headings and sub-headings used in planning the report still needed?
5. Is the purpose and scope of the report stated clearly and concisely in the Introduction?
6. Is each paragraph relevant, necessary and in its proper place?
7. Are the paragraphs in each section in the most effective order?
8. Is the connection between paragraphs clear? Cross out anything that is irrelevant. Remember: writing is deleting.
9. Is each paragraph interesting? Is the topic clearly indicated and is everything in the paragraph relevant to the topic? Is the emphasis in the most effective place?
10. Are all arguments forcefully developed and taken directly to their logical conclusion, and is anything original emphasized sufficiently?
11. Is there an important point which could be more clearly expressed, or which should be put more forcefully in an illustration? Should any illustration be replaced by a few lines of text?
12. Does the report meet all the requirements of scientific writing? Is each statement accurate, based on sufficient evidence, free from contradictions, and free from errors of omission? Are there any words such as "many" or a "few" which can be replaced by numbers?
13. Is each sentence necessary? Does it repeat unintentionally something that has already been written?
14. Could the meaning of any sentence be better expressed? Are there unnecessary words?

15. Is each sentence easy to read? Does it sound well when read aloud, and is the emphasis in the most effective place?
16. Are your conclusions clearly expressed?
17. Have you achieved your purpose and kept within the frame of reference?
18. Has anything essential been left out? Are all the reader's questions answered?
19. Are any technical terms, symbols or abbreviations sufficiently explained?
20. Are there any faults of logic or mistakes in spelling or grammar?
21. Are you consistent in spelling, and in the use of capitals, hyphens and quotation marks?
22. Are all the references accurate, especially the spelling of names? Do the dates in the list of references agree with those given in the text?
23. English is a language of international communication. If your report is for a wide readership, or for readers with different interests, check that your writing style is clear and direct.
24. Check the summary.
25. Are all your revisions improvements? Is every word, letter, number and symbol in your manuscript legible?
26. Are all pages numbered and in their correct order?
27. Does the revised report read well and is it well balanced?

**8. CHECK LIST FOR REFEREES**

1. Is the paper suitable for publication in this journal?
2. Do you recommend publication of the paper  
(a) as it is, or  
(b) after revision?
3. Is the work reported original: has any part been published before?
4. Is the work complete? Is it a contribution?
5. Are there any errors or faults of logic?
6. Is the paper clearly written?
7. Are there ambiguities?
8. Are any parts badly expressed?
9. Are any parts superfluous?
10. Are any points overemphasized or underemphasized?
11. Is more explanation needed?
12. Does the paper conform to the rules of the journal?
13. Should all parts of the paper be published?
14. Is the title clear, concise and effective?
15. If key words are required, are these appropriate?
16. Is the abstract comprehensive and concise?
17. Are the methods sound?
18. Are the methods described clearly and concisely?
19. Are the illustrations and tables properly prepared?
20. Are the conclusions supported by sufficient evidence?
21. Are all relevant references cited?
22. Are any of the references cited unnecessary?





## **9. STYLE AND LAYOUT**

This is only a short list of tips. For more information see the references on style.

The layout is prescribed by the organisation which will publish the work. Use their templates and style files. Do not invent your own layout because it will cause confusion.

### **9.1. TERMINOLOGY AND WORD CHOICE**

Use a well-chosen terminology. As far as the non-technical words are concerned, you should avoid using the same words too often. For technical terms, however, always use the same words when you mean the same thing.

Do not invent your own terminology if the literature you have read already provides you with the terms you need. It can happen that two different authors use different terms for the same thing; this often does not justify that you introduce yet a third term.

Delete uninformative words and avoid redundancy. Using fewer words to convey a message improves readability.

- Use one word to replace a phrase
- Avoid grandiloquence, a pompous style
- Avoid clichés and euphemisms
- Do not use the same word twice or more in the same sentence.
- Use synonyms (via the thesaurus).  
For two reasons: to avoid monotony, or to express the precise shade of meaning for a specific context.
- Form the possessive singular of nouns with 's.

### **9.2. SPELLING**

- Check your spelling. Most text processors have spelling checking possibilities; use them! You should also check for grammatically correct spelling (e.g. a singular subject requires the verb to be in singular).
- As the American influence in the field of science is strong it may be preferable to join the main stream and use American spelling. “Flavor, catalog, modeling” and “optimize” are

American while “flavour, catalogue, modelling and optimise” are English words.

- Compounds in Dutch are often two words in English. Example: “tekstverwerker” is “text processor”.

### 9.3. SENTENCE STRUCTURE

- The number of the verb must agree with the number of the subject. Recognize irregular plurals such as data and formulae. If singular and plural subjects are joined by “either .. or” (“neither .. nor”), the verb must agree with the nearest subject.
- Active and passive voice.  
In the active voice the subject performs the action. In the passive voice the subject receives the action. The active voice results in shorter sentences because the passive voice always combines some form of the verb to be with a past principle. It is, however, the common but not preferred voice for technical papers.
- Nouns from verbs  
Verbs can express action. For many action verbs there are nouns that expresses the result of the action. Example: “perform/performance”. Using the noun form expresses the action indirectly.
- The perfect tense of the passive voice: Use “has/have/had/ been” instead of “is/are/was/were” when referring to some action that has finished.
- Adjective/adverb: different words in English for one Dutch word. The adverb is constructed most of the time by adding the suffix -ly behind the adjective. Example: an easy task; and: The task is easy; But: The task can be preformed easily.
- Omit needless words.
- Keep related words together.
- Prevent text between brackets. Better use a new sentence.

#### 9.4. PUNCTUATION.

The common purpose of punctuation is to make writing as clear as possible in its meaning.

- Use periods (.) for offloading overpacked sentences.
- Use semicolons (;) to connect two sentences. A semicolon is less than a period but more than colons.
- Use question marks (?) to spark interest.
- Use colons (:) to achieve conciseness.
- Use commas (,)
  - to avoid confusion,
  - create a short reading break or
  - replaing a conjunction such as *and*.
- Punctuation marks as the dot, comma, semicolon, etc. should be placed immediately after the preceding word and should be followed by a space.
- An open parenthesis has only space at its left and a close parenthesis has only space at its right (and no space around it when followed by a dot, comma, etc.).
- In a series of three or more terms with a single conjunction, use a comma after each term except the last. Example: “Red, white, and blue”.
- Enclose parenthetic expressions between commas. This rule is difficult to apply; it is frequently hard to decide whether a single word, such as however, or a brief phrase, is or is not paranthetic. If the interuption flow of the sentence is but slight, the writer may safely omit the commas.
- Place a comma before “and” or “but” introducing an independent clause.
- Do not independent clause by a comma. If two or more clauses, grammatically complete and not joined by a conjunction, are to form a single compound sentence, the proper mark of punctuation is a semicolon.

### 9.5. DASH

A dash ('-') is used to group words in nouns consisting of multiple words to indicate that a word belongs to its predecessor(s) rather than its successors. One e.g. writes data-path synthesis with a dash because one refers to the synthesis of "data paths", while one writes digital signal processing without a dash because one refers to a special case of "signal processing". Consider the wrongly written version: "data path synthesis" would be interpreted as some special case of "path synthesis", which is an unknown notion.

### 9.6. TYPE-SETTING

- It is the convention in English to capitalize all words in the title except for articles and prepositions. In Dutch only the first word in the title should be capitalized.
- The main text uses the Roman version of some font with proportional spacing (e.g. Times, Helvetica or Computer Modern).
- Use the same font for all text, except for text in legends and captions.
- Bold text should normally not be used outside headings of chapters and sections.
- Do not use *italics* to emphasize a part of a text. Rather use underlining. Or capitals. *Italics* are reserved for physical quantities.
- Use “ ” for quotes.
- Start all chapters, appendices and unnumbered chapters on a new page.

### 9.7. SYMBOLS FOR UNITS AND PHYSICAL QUANTITIES

- Symbols for units shall be in plain characters.
- Symbols for physical quantities shall be in *italic* characters.  
Example: In the expression  $I = 150 \text{ mA}$ ,
  - $I$  is the symbol for a physical quantity (current),
  - $A$  is the symbol for the unit of current (ampere), and
  - $m$  is the symbol for the prefix milli.
- Use (for instance) Times Roman font for physical quantities  
Example:  $I$  is better than  $I$  (Arial font).

- When an unfamiliar symbol is first used in text, it should be followed by its name in parentheses. Only the symbol has to be used thereafter.
- Symbols for units are written in lower-case (small) letters, except for the first letter if the name of the unit is derived from a proper name (Pascal, Ampere, Joule), and except for a very few that are not formed from letters.
- The form of unit symbols is the same for both singular and plural.
- When a compound unit is formed by multiplication of two or more other units, its symbol consists of the symbols for the separate units joined by a raised dot (for example, N.m for newton meter). The dot may be omitted in the case of familiar compounds if no confusion would result. For example, V. s and V s are both acceptable representations of the unit weber, Wb.
- When a unit symbol prefix is identical to a unit symbol, special care must be taken. For example, the symbol m.N indicates the product of the units meter and newton, while mN is the symbol for millinewton.
- Hyphens should not be used in symbols for compound units.
- Positive and negative exponents may be used with unit symbols.
- When a compound unit is formed by division of one unit by another, its symbol consists of the symbols for the separate units either separated by a solidus (for example, m/s for meter per second) or multiplied using negative powers (for example,  $\text{m}\cdot\text{s}^{-1}$  for meter per second). In simple cases, use of the solidus is recommended, but in no case should more than one solidus on the same line, or a solidus followed by a product, be included in such a combination unless parentheses are inserted to avoid ambiguity. In complicated cases, negative powers should be used.

### 9.8. ABBREVIATIONS

Never use an abbreviation before defining it. If you use many abbreviations, include a list of abbreviations in your report (as an appendix). Although most abbreviations consist of capital letters, you should not use initial capitals in the words that compose the abbreviation (unless any of the words is a proper noun).

### 9.9. FIGURES AND TABLES

Always refer to a figure or table from the main text (using the figure or table number). Otherwise the reader neither knows how to relate the figure to the text nor when the moment has come to look at the figure. It is a good habit that the first reference to a figure is on the same page as the figure itself or on a preceding page. Use a meaningful caption for every figure or table. Example: "Figure n: the data-flow graph of a second-order filter section".

In the main text, the words "figure", "table", "section", etc. followed by a specific number should be treated as proper nouns and should start with a capital. Example: The data obtained for the graph displayed in Figure 3 of Section 2.1, are summarized in Table 7. But: "The tables in the previous section lead to a clear conclusion".

It is a convention that the title of a table is placed above the table, but the title of a figure is placed below the figure.

### 9.10. ENUMERATION AND BULLETS

Enumeration and bullets are more commonly used since PowerPoint is widely used.

Use enumeration if you want to list a logical order. The list should contain similar quantities which

- Exclude (at least without overlap),
- Are together complete (at least somewhat exhaustive),
- Are of the same order or importance,
- Are listed in a logical order (if that exists).

Try to use enumerated lists for successive lists. Otherwise use bullets. Make homogeneous lists and use the proper linguistic style.

### 9.11. TYPICAL DUTCH

- “If” or “when”: Use “if” for a decision, use “when” for a time related event
- “Then” is a moment in time. “Than” is comparative.
- The ..ing verb should be used only for ongoing or current activities.
- Long sentences: use a maximum of 20 words in one sentence.
- Much, little, less, amount is something uncountable. Many, few, fewer, number for countable things.
- Paragraph is “alinea” in Dutch. Use “section” instead of paragraph.
- “Send” becomes “sent” in the past tense. Also for “build-built” and “spend-spent”.
- The use of apostrophe (won't) should be avoided in technical texts.
- The use of a instead of an: an is only used when the word that follows starts with a vowel sound. So, it is “an uncle” and “a university”, because “university” is pronounced as 'you-niversity'. The rule also holds for abbreviations: it is “an” FU, because “FU” is pronounced as “eff you”.

## 10. BIBLIOGRAPHY

This small guide is based on experience, discussions, making numerous errors and using information from

- ISO 214
  - ISO 215
  - ISO 999
  - ANSI/NISO Z39.14-1997
  - ANSI/NISO Z39.16
  - ANSI/NISO Z39.18-1995
  - Ed. C. Harkins, D. Plung: A guide for writing better technical papers, IEEE Press, 1981
  - R. Barrass, Scientist must write, Science paperbacks, 1978
  - J. Yang, An outline of scientific writing, World scientific, 1995
  - Steehouder e.a., Leren Communiceren
  - NIAW course Wetenschappelijk rapporteren
  - Sabih Gerez, Hints for report writing,  
<http://utelnt.el.utwente.nl/links/gerez/hints/report-latest.pdf>
  - A. Sekey, Abstract, Conclusions and Summaries, IEEE Transactions on Professional Communication, vol. PC-16, pp. 25-26, June 1973.
  - W. Skunk, Elements of Style, 1918, 1979
  - Style Guide European Union,  
<http://europa.eu.int/comm/translation/en/stygd>
  - Guide for students TEL group  
[http://utep.el.utwente.nl/tel/onderwijs\\_uk.htm](http://utep.el.utwente.nl/tel/onderwijs_uk.htm)
- and all persons who reviewed my reports and papers and gave thriving advice.