

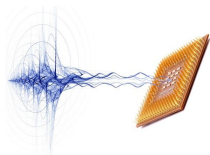
# Writing a scientific report/paper

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# Introduction and motivations

- **Writing report and paper is an essential activity in Research**
- Publications are crucial for the visibility and the career of a researcher
- Master by Research is a "training/coaching to research"
- First year PhD students is still in training
- Aim of this conference is to give the principal foundation for writing:
  - your bibliography report,
  - a research report or your MSc/PhD thesis,
  - your first research papers.

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# Outline

- 1 Introduction and motivations
- 2 Writing a paper
- 3 Typographic rules
- 4 Search for references
- 5 Références
- 6 Master: étude bibliographique

# Writing a paper or a report

- Formatting is very important...
- but of course the scientific contents is fundamental
  
- In this conference, we mainly concentrate on formatting of the document, which has to be perfect!
- Content and outline: author(s), abstract, introduction, state of the art / related work, paper body, results, conclusion, references
- Use  $\LaTeX$  or maybe  $\LaTeX$  or eventually LyX...

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# How to write a paper?

- A paper is telling a story...
  - Context and motivations (why is this paper important)
  - Contribution(s) (what is new)
  - Scientific methodology (rigorous approach)
  - Results highlighting the benefits of the contribution
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  - The contribution must be very clear. You should be able to highlight it through a sentence like “the contribution of the paper is...” with no more than 20 words.
  - The title of the paper **MUST** reflect the contribution

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## Reviewer's point-of-view

Reviewers typically look for following things:

- 1 what is the problem that the authors are solving?
- 2 how are they solving it?
- 3 is the solution logical and correct?  
is there a better way to solve the problem?
- 4 how is the approach related to the existing work?
- 5 is the problem relevant?

Well-written paper/report should answer to these questions with ease.

## Reviewer's point-of-view

- The main reason for paper being rejected is too thin technical content.
- Papers without content will (probably) get rejected, even if they are written well.
- But badly written papers with good content will also probably get rejected, if reviewers don't understand it.

# Title and abstract

## Title

Title is important: must give a good idea of the content and of the principal contributions

- not *“Wireless Sensor Networks”*
- but *“A Low-Power MAC Protocol for Energy-Constrained Wireless Sensor Networks”*

Avoid: A new . . . , A Novel . . . , An improved . . . In 20 years, is that still new/novel? Only used for big discovery or disruptive research contribution.

## Abstract/summary

should help to identify the innovative contribution

- one unique paragraph of roughly 100-200 words
- context (quickly), objectives, approach, main results, *“claims”*

Title and abstract will often determine if your paper will be read or not!

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# Introduction

- Start by one or two paragraphs on the context of this work
- Write a paragraph clearly stating the contribution
- Position the work with regard to state-of-the-art (SoA)  
(usually this part is also in a separate section with more details and positioning)
- A paragraph to describe the outline of the article

The paper is organized as follows. Section 2 reviews related work on ... while Section 3 introduces the proposed algorithm. ... Finally, Section 5 concludes the paper and gives some future prospects.

## Related work

- Purpose: help the reviewer to understand the contribution (at least to give him confidence that there is a contribution if he is not an expert)
- If possible use a *Related work* section
- Classify the related work (e.g. system level simulation, device fabrication, etc.)
- For each closely related work, you should be able to write a sentence starting by “Compare to this work, ...”
- Avoid too general comparison: “these papers do not ...”



# Article body

- Article: no more than 4 to 5 sections with no more than 2 sub-levels
- Report: no more than 4 to 5 chapters of 3 to 4 sections and 2 sub-levels
- Every section has to start with an introduction to clearly situate the investigated idea
- and to end by a small summary and a transition
- Title of sections

1.2 Estimation of the Power Consumed by a VLSI Circuit

# Figures

- Figures are useful but but should not be used if they are too general or do not bring clarity to the article
- All must be original ones
- All must be cited, commented and include a clear legend (ideally every legend has to be "*self-contained*")

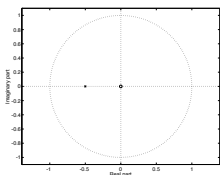


Figure: Simulation results

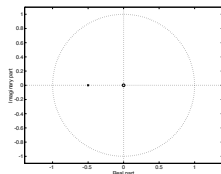


Figure: Pole-zero plot of system  $H(z)$  proving its stability

Avoid: "As shown by the figure below..."; hardly readable and dense figures

## References in the text

How to cite a figure, an equation, a section or a table?

- Figure 1 illustrates... (or Fig. 1)
- Table 1 shows... (or Tab. 1)
- From Equation 1... (or Eq. 1)
- Section 1.1 gives... in Section 1.2 we give...

# Notations and mathematical symbols

- Verify uniformity and unicity of mathematical notations
- All symbols must be defined
- Always put symbols in italic in the text:  $x$ ,  $i$
- 3 or three? 110 or hundred and ten?
- An equation is part of sentence

Dynamic power  $P_d$  consumed by a logic gate is defined as

$$P_d = \alpha \cdot C \cdot f \cdot V_{dd}^2$$

where  $\alpha$  is the activity,  $C$  the capacitance,  $f$  the frequency and  $V_{dd}$  the supply power.

# Discussions and comments on results

Giving results without explanation/analysis is useless

- Experimental results must be commented clearly and in detail
- Describe the experimental setup
- A discussion (if necessary) must:
  - position the presented results w-r-t to state-of-the-art
  - show the innovation of the approach
  - explain the gains of the proposed approach

“We show 90% improvement of . . .”: it is obvious that such comparison is NOT fair or partial.

- *It is a tricky exercise, but which is important and even fundamental in a publication*

# Conclusion

- Summarize contributions and results
- Indicate the limits of the approach (if there is some!)
- Give some perspectives to this work
  
- Acknowledgment section
  - cite people that have contributed to the paper (or to its improvement)
  - cite fundings (contracts, PhD grants, etc.) for the work

# Bibliography/References

- For positioning the work
- Not too many references (never cite an unread article)
- Not too little references (do not forget an important reference)
- Sometimes it can be difficult to position the work, but it is however essential
- References must include a set of mandatory fields: see next slides

# References

A journal paper:

```
@ARTICLE{MenardIEEEETCSI08,  
  author = {D. Menard and R. Rocher and O. Sentieys},  
  title = {{Analytical Fixed-Point Accuracy Evaluation in LTI Systems}},  
  journal = {IEEE Transactions on Circuits and Systems I: Regular Papers,},  
  year = {2008},  
  volume = {55},  
  number = {10},  
  month = {November},  
  pages = {3197-3208}  
}
```

A paper in conference proceedings:

```
@INPROCEEDINGS{NguyenICC08,  
  author = {T.D. Nguyen and O. Berder and O. Sentieys},  
  title = {Impact of transmission synchronization error and cooperative reception techniques},  
  booktitle = {Proceedings of IEEE International Conference on Communications (ICC'08)},  
  year = {2008},  
  pages = {4601--4605},  
  address = {Beijing, China},  
  month = may  
}
```



# References

A book chapter:

```
@InCollection{Sentieys2004,  
author = {R. David and S. Pillement and O. Sentieys},  
title = {{Energy-Efficient Reconfigurable Processors}},  
booktitle = {{Low Power Electronics Design}},  
editor = {C. Piguet},  
chapter = {20},  
publisher = {CRC Press},  
series = {Computer Engineering, Vol 1},  
month = aug,  
isbn = {0-8493-1941-2},  
year = 2004  
}
```

A conference paper edited by LNCS (Lecture Notes in Computer Science):

```
@inproceedings{Menard04SCOPES,  
author={D. Menard and O. Sentieys},  
title={{DSP Code Generation with Optimized Data-word Length Selection }},  
booktitle={{8th International Workshop on Software and Compilers for Embedded Systems (SCOPES)}},  
year={2004},  
publisher = {Springer-Verlag},  
series = {Lecture Notes in Computer Science (LNCS)},  
volume = {3199},  
isbn = {3-540-23035-1},  
pages={214-228},  
month={September},  
address={Amsterdam, Netherlands}  
}
```

# References

A PhD thesis:

```
@PhDThesis{Cool07,  
author = {R. Cool},  
title = {{The Title}},  
school = {{Université de Rennes 1}},  
month = sep,  
year = 2007  
}
```

A Master thesis:

```
@MasterThesis{Cool04,  
author = {R. Cool},  
title = {{The Title}},  
school = {{Université de Rennes 1}},  
month = sep,  
year = 2004  
}
```

A research report:

```
@TechReport{,  
author = {},  
title = {{}},  
institution = {{IRISA/INRIA}},  
typr = {},  
address = {},  
month = ,  
year = {}  
}
```

A book:

```
@Book{,  
author = {},  
title = {{}},  
publisher = {{}},  
year = {}  
}
```

# Some typographic rules

- Typography is the art to gather characters in order to create words and sentences
- Set of rules to follow to write a paper or a report

## Typography (english)

Quotes	" ... " or " ... "
Punctuation <sup>1</sup>	: , ; . ? ! ( ) – — pas d'espace avant :;,. colon, comma, semicolon, period/dot, etc.
Caps and titles	1.2 Proposed Method <small>(no punctuation in the titles and subtitles)</small>
Abbreviations	ASICs are...
for exemple	e.g.
that is to say	i.e.
pages	pp. <i>vs, versus</i>

In an english text, latin (or bretons or french) words must be in italic: *in fine, rendez-vous*

All mathematical symbols must be in italic<sup>2</sup>: *N, l, V<sub>dd</sub>, sin x...*

---

<sup>1</sup>let  $\LaTeX$  do the job for you!

<sup>2</sup>\$ ... \$ en  $\LaTeX$

## Signes typographiques (français)

Guillemets

<< ... >><sup>3</sup>

Ponctuation<sup>4</sup>

: , ; . ( ) – —

espace avant : ? ! demi avant ;

Majuscules et titres

1.2 Méthode proposée

Abréviations/Abbreviations

Les ASIC sont...

par exemple

p. ex. (e.g. toléré)

c'est-à-dire

c.-à-d.(i.e. toléré)

pages

p.

Dans un texte en français, les mots anglais doivent être en italique: "le *design* de ce circuit..."

Tous les symboles mathématiques doivent être en italique<sup>5</sup> :  $N$ ,  $l$ ,  $V_{dd}$ ,  $\sin x$ ...

---

<sup>3</sup>\og ... \fg en L<sup>A</sup>T<sub>E</sub>X(french/babel)

<sup>4</sup>laissez L<sup>A</sup>T<sub>E</sub>X le faire pour vous!

<sup>5</sup>\$ ... \$ en L<sup>A</sup>T<sub>E</sub>X

## Listes (français)

Les listes sont classées en deux classes :

- soit elles font partie d'une phrase unique<sup>6</sup>,
- soit elles sont elles-mêmes composées de plusieurs phrases.

Dans une liste constituant une phrase :

- les éléments d'une liste commencent par une minuscule et se terminent par une virgule (ou un point-virgule) ;
- le dernier élément se termine par un point.

L'anglais est beaucoup moins stricte sur les listes : les majuscules sont utilisées et les éléments peuvent se terminer par un point.

---

<sup>6</sup>typiquement après :

# Lists (english)

Lists are classified into two categories:

- 1 they can be part of a single sentence,
- 2 they can be a set of sentences.

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## Typographic rules: example

### 2.3.1 The advanced Fast Fourier Transform of real Numbers.

The FFT ( Fast Fourier Transform ) was proposed by J.W. COOLEY and John Tukey in [CT65, p. 10-12]. The DFT is defined a priori by the following equation :

$$X(\Omega) = \sum_{n=-\infty}^{\infty} x(n) e^{-j\Omega n} \quad (1)$$

$X(\Omega)$  is the transform of the signal  $x(n)$ . It could be used for spectral analysis, modulation, etc... The properties of the DFT are:

- linearity.
- Time-frequency shifting,
- Convolution product .



## Quelques règles typographiques

### 2.3.1. La Transformation Rapide de Bases de Données Avancées.

A la fin de sa très célèbre publication sur les BDAs, J.M. PENDIBIDU [PEN82, pp. 251–253] signale que l'emploi d'un ZEN (Zero Ending Node) permet de "transformer" les noeuds n° 1 à n avec des **évaluations paresseuses** : la 1<sup>re</sup> disparaît et est remplacée par la 2<sup>de</sup> qui est remplacée par la 3<sup>ième</sup>, etc... Ceci implique d'une part, que la racine et/ou son premier descendant soit *full*, et d'autre part que les feuilles, ou leurs prédécesseurs soient de type *fib.*, *fab.*, ou *fob.* On a appliqué ceci au vieux con-

cept TH du Professeur Pendibidu dans divers cas, e.g. au poids des publications de la DANI ; les gains sont:

- i) Poids : -17. 89 Frs pour 100 Kgrs (Approximativement).
- ii) Débits : 2 terabit pour 3 Ampère vs 3 pour 2 avant, ce qui est ***très bon***.

Nous utilisons désormais...

Pour plus de détails (en français): "Les petites leçons de typographie" de Jacques André <http://www.irisa.fr/faqtypo> [André09]

# How to find a reference or some publications on a topic?

- Google and Google Scholar
  - `http://scholar.google.com`
  - Search on several databases by: author, keywords, etc.
  - Give a `bibtex` entry (but often needs to be modified)
  - Caution: results are sorted by number of citations, which does not correspond always to the most relevant
- `ieeexplore`: `http://ieeexplore.ieee.org`
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# Be careful with keywords...

## Search result on Google Scholar

- dynamic reconfigurable architecture
  - `http://scholar.google.com/scholar?hl=en&q=dynamic+reconfigurable+architecture`
- (low (energy OR power)) dynamic reconfigurable architecture
- dynamic reconfigurable architecture author:sentieys

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# Conclusions

- Writing well is long, difficult, but can be easily improved
- However, a good paper is first of all a good research work with CLEAR objectives and a main contribution
- Formatting must be perfect: proofreading, reviewing, reformulating is a lot of work
- Use good papers or theses as example
- Of course, Plagia = No Diploma!
- Thanks to  $\LaTeX$  for the rest!



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# Références



P. Quinton, "Quelques conseils pour écrire et publier un article scientifique," *Conférence au DEA d'Informatique de l'IFSIC*, 2003.



J. André, "Petites leçons de typographie,"  
<http://jacques-andre.fr/faqtypo/lessons.pdf>, 2009.



D. Lacroix, "Mémento de typographie anglaise à l'usage de rédacteurs francophones,"  
<http://www.panamo.eu/RESS/anglais.html>, 2009.



WikiBook, " $\LaTeX$ ," <http://en.wikibooks.org/wiki/LaTeX>,  
<http://upload.wikimedia.org/wikibooks/en/2/2d/LaTeX.pdf>, 2007.

# Références (exemples)



A. V. Oppenheim and R. W. Schaffer, "Discrete-Time Signal Processing, second edition," *Prentice-Hall*, 1999.



D. Menard, R. Rocher and O. Sentieys, "Analytical Fixed-Point Accuracy Evaluation in Linear Time-Invariant Systems," *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 55, no. 10, pp. 3197–3208, November 2008.



T. Nguyen, O. Berder, and O. Sentieys, "Impact of Transmission Synchronization Error and Cooperative Reception Techniques on the Performance of Cooperative MIMO Systems," *IEEE International Conference on Communications, ICC'08*, pp. 4601–4605, Beijing, China, May 2008.



D. Menard and O. Sentieys, "DSP Code Generation with Optimized Data-word Length Selection ," in *8th International Workshop on Software and Compilers for Embedded Systems (SCOPES 2004)*, ser. Lecture Notes in Computer Science (LNCS), vol. 3199. Amsterdam, Netherlands: Springer-Verlag, September 2004, pp. 214–228.



R. David, S. Pillement, and O. Sentieys, "Energy-Efficient Reconfigurable Processors," in *Low Power Electronics Design*, ser. Computer Engineering, Vol 1, C. Piguet, Ed. CRC Press, Aug. 2004, ch. 20.

## Master: étude bibliographique

- Rapport de 10-15 pages contenant au moins une dizaine de références bibliographiques et validé par votre encadreur
  - Document structuré possédant un fil conducteur
  - L'étude peut être faite par article ou par famille d'articles regroupés autour d'un même sujet
  - Introduction : situe le contexte dans lequel se déroule le travail, définit la problématique du projet ainsi que les objectifs à atteindre, présente le plan
  - Corps: présente différents travaux en décrivant leurs spécificités, discute de l'intérêt ou non d'une publication par rapport à la problématique personnelle, critique ou décrit les limites des méthodes présentées dans les articles
  - Conclusion: reprend les faits essentiels de l'étude de la littérature sur le sujet, ouverture vers le travail de recherche du stage proprement dit, établissement du plan de travail, nouvelles hypothèses, élaboration d'une nouvelle méthode, mise en évidence d'un cas de figure peu ou pas traité dans la littérature
- Présentation de 20 minutes plus questions devant un comité de lecture



## Appendix: typographic rules

- **full stop/period (.)**: the point is to mark the end of a sentence. No space before the fullstop and space after.  
Concerning numbers, no full stop, but a non-breaking space: Ex: 4 500 000.
- **Comma (,)**: no space before and space after.  
The comma indicates a short pause and serves to separate the parts of a sentence. Don't place a comma between a subject and a verb. Don't not place a comma before a bracket, parenthesis, hyphen, but after.
- **Semicolon (;)**: The semicolon is usually placed between two independent proposals and indicates a link with the preceding sentence. Non-breaking space before the semicolon and space after the semicolon.
- **Colon (:)**: the colon announce a list or a quotation. Non-breaking space before and space after the colon. No capital after.
- **Question mark (?)**: the question mark is placed at the end of an interrogative sentence. Non-breaking space before the question mark and space after.
- **Exclamation mark (!)**: the exclamation point is placed at the end of exclamatory sentence or end of an interjection.  
Non-breaking space before the exclamation mark and space after.
- **Ellipsis (...)**: the dots are always three in number, and mark a hesitation, a thought not expressed or are placed following a list too long. No space before the dot and space after.
- **etc.**: is preferred to "... " for a shorten long list. Place a coma before (apple, peach, etc.). It is often seen written: etc. ... It is a mistake. One point will be fine.
- **Brackets ( )**: parentheses are used to isolate a sentence in a passage relating to a point, to detail or supporting a fact. The space before and space after parentheses, but no space inside.
- **Dash (–)**: the dash is used to mark the change of interlocutor in a dialogue, detail an observation within a sentence (it looks much better than the parentheses), or to submit a list. Non-breaking space after. If within a phrase, breaking space before, space after.

## Typographic rules: example

### 2.3.1 Advanced Fast Fourier Transform of Real Numbers

The FFT (Fast Fourier Transform) was proposed by J.W. Cooley and J. Tukey in [CT65, pp. 10-12]. The DFT (Discrete Fourier Transform)  $X(\Omega)$  of the signal  $x(n)$  is defined *a priori* by

$$X(\Omega) = \sum_{n=-\infty}^{\infty} x(n) e^{-j\Omega n} \quad (2)$$

with  $\Omega = 2\pi fT$ ,  $f$  the frequency and  $T$  the sample period. The properties of the DFT are:

- linearity,
- time-frequency shifting,
- convolution product.

# Quelques règles typographiques

## 2.3.1. Transformation rapide de bases de données avancées

À la fin de sa très célèbre publication sur les BDA, J.-M. Pendibidu [PEN82, p. 251-253] signale que l'emploi d'un ZEN (*Zero Ending Node*) permet de « transformer » les nœuds n<sup>os</sup> 1 à  $n$  avec des *évaluations paresseuses* : la première disparaît et est remplacée par la seconde qui est remplacée par la troisième, etc. Ceci implique, d'une part, que la racine ou son premier descendant soit *full* et, d'autre part, que les feuilles ou leurs prédécesseurs soient de type *fib.*, *fab.* ou *fob.* On a appliqué ceci au vieux concept TH du professeur Pendibidu dans divers cas, notamment au poids des publications de la DANI ; les gains sont :

- poids : -17,89 F pour 100 kg (approximativement),
- débits : 2 terabits pour 3 ampères contre 3 pour 2 avant, ce qui est *très bon*.

Nous utilisons désormais...