How to Prepare your Short Paper for the Scientific Writing Session

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December 13th, 2020

PPGEM Scientific Writing Seminars: Season **2020**
www.ct.ufpb.br/ppgem

Keywords: Scientific writing, paper writing, LaTeX typesetting, standardisation.

Abstract

This paper explains how to write a short paper for seminaries.

1 Introduction

This short paper is intended to introduce a self-explained tutorial on how to prepare summarised texts to be presented in the form of internal seminars of the Graduate Program in Mechanical Engineering (now on PPGEM) from Federal University of Paraíba (UFPB). In order to suggest a standard formatting for better organization and registration at PPGEM as well as to help incoming students to be acquainted with the LaTeX typesetting, this paper also dismembers into a few goals, such as: i) to work as an introductory text for training in scientific writing among the PPGEM's students and seminar attendees; ii) to strengthen the practical use of English language over the academic environment; iii) to provide guidelines to outline the first version of those research issues that will may be turned into extended abstracts and/or conference papers, and iv) to enhance the PPGEM's academic competitiveness worldwide.

2 Text elements and organization

Basically, your paper should have five major parts: i) Introduction; ii) Methodology; iii) Results; iv) Discussion and v) Conclusion, although the parts iv) e v) may be combined into a unique section.

You are free to set out the title of your paper provided that you have good reasons to support your choice. It should be totally capitalised. All the sections and subsections should have only the first letter capitalised, except when a proper noun is required. The following examples could be used for titles:

- *Robust Methods to Calculate Error Estimates in Div- Formulations*,
- *Weak Disturbances Formed from Pulsating Wave Sources* or
- *Continuum Mechanics Bookshelf: from Truesdell to Mase*,

whereas

- *Supercritical flows for* $10 < Fr < 100$,
- *Physicochemistry of copper nanoparticules* or
- *Action of the gradient vector*

could be applied to sections or subsections.

3 Model and data presentation

This section explains how to insert equations, figures and tables into your text as well as references to them.

3.1 Equations

If you need to write equations in your text, whether to represent a model based on differential equations, whether to define expressions of lower complexity, the usual LaTeX environments are applicable to whatever you intend to do, *e.g.* a uniquely labelled equation

$$\frac{L}{A}\frac{dW}{dt} = \rho_0 \beta g \oint T dz - f\frac{L}{D}\frac{W^2}{2\rho_0 A^2} \tag{1}$$

or multi-line labelled equations like

$$\frac{\dot{\mathrm{T}}_1}{\dot{\mathrm{t}}} + \frac{W}{A\rho_0}\frac{\dot{\mathrm{T}}_1}{\dot{\mathrm{s}}} = \frac{4q}{D\rho_1 c_p} \tag{2a}$$

$$\frac{\dot{\mathrm{T}}_2}{\dot{\mathrm{t}}} + \frac{W}{A\rho_1}\frac{\dot{\mathrm{T}}_2}{\dot{\mathrm{s}}} = -\frac{4U(\overline{T} - T_s)}{D\rho_2 c_p} \tag{2b}$$

$$\frac{\dot{\mathrm{T}}_3}{\dot{\mathrm{t}}} + \frac{W}{A\rho_2}\frac{\dot{\mathrm{T}}_3}{\dot{\mathrm{s}}} = \sum_{n=-\infty}^{\infty} \sin(n\lambda_3) T_3 \tag{2c}$$

or

$$\begin{aligned} f &= 8\left[\left(\frac{8}{\Re}\right)^{12} + (A + B^{-1,5})\right]^{1/12} \\ A &= \left\{-2,457 \ln\left[\left(\frac{7}{\Re}\right)^{0,9} + \frac{0,27e}{D}\right]\right\}^{16} \\ B &= \left(\frac{37530}{\Re}\right)^{16}. \end{aligned} \tag{3}$$

To reference equations, you may use the commands `\ref{<ref>}` or `\eqref{<ref>}`. "Equation (1)" is the way how you should refer to an equation at the beginning of a statement. "Equations (2a-2c)" is the second way, for multi-line cases. If you need refer to another equation in the middle of the text, then you should write "Eq. (2a-2c)" or just "Eq. (3)".

3.2 Figures

Figures are added to your paper as a *nonfloat* element by calling

```
\begin{center}\includegraphics[...]
{figs/<fig_name>}
(...)
\end{center}
```

so that

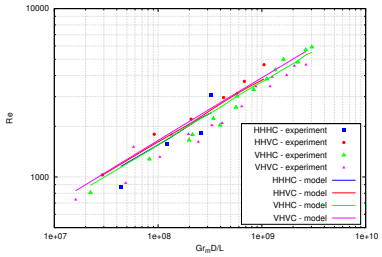

Figure 1: Mass flow with time.

is a good example of well placed figure. Reference to figures follow the examples given in Subsection 3.1. That is to say, "Figure 1" is the way how you should refer to a figure at the beginning of a statement. If you need refer to a figure in the middle of the text, then you should write "Fig. 1". In this case, parentheses are not required.

3.3 Tables

Tables like Table 1 can also be inserted into your text through the environment `tabular`.

	lower bound	upper bound
Ambrosini et al. [1]	285 W	480 W
present model	390 W	707 W

Table 1: Stability thresholds using Churchill's friction correlation, with external fluid temperature of 30°C.

Reference to tables should not be abbreviated. That is to say, "Table 1" is the way how you should refer to a figure both at the beginning and in the middle of a statement. Parentheses are not required here as well.

3.4 Citations

To cite other authors or references, use the textual and parenthetical commands provided by `natbib` package `\cite{<ref1>}` or `\citep{<ref1>}`. Add your references to the file `refs.bib` and compile the document by calling `bibtex`. The usual `bib` entries are available (see file `refs.bib` in the root directory). This paper's bibliography, for instance, is formed by: a M.Sc. thesis [5], a tech report [4], a book [2], an inproceedings [3], and a Ph.D. thesis [6].

4 Conclusions

Here, you will end up your text by drawing conclusions and comments about future work. In order to reduce the contents, we encourage you to summarize the main results by using an itemised list as follows:

- this tutorial has discussed the PPG-EM's paper template;
- the usability of LaTeX typesetting was presented;
- a standard template for internal seminars was suggested;
- to develop other presentation templates is a future goal.

5 Acknowledgments

(This section is optional). However, a simple remark like "The authors thank to Prof. Gustavo Oliveira for sharing insights and ideas in developing the PPGEM's academic templates." may be included.

Appendix: a note on the `siunitx` package

This template supports the LaTeXpackage `siunitx` to deal with SI units. For a complete overview, read the package documentation available on: http://tug.ctan.org/macros/latex/exptl/siunitx/siunitx.pdf. Some useful commands are: `\ang`, `\num`, `\si`, `\SI`, and `\SIlist`. For example, the statement

```
\SI[mode=text]{1.23}{J.mol^{-1}.K^{-1}}
```

will be read as $1.23\,\mathrm{J\,mol^{-1}\,K^{-1}}$. Try other variations by looking at the documentation.

References

[1] W. Ambrosini, N. Forgione, J. C. Ferreri, and M. Bucci. The effect of wall friction in single-phase natural circulation stability at the transition between laminar and turbulent flow. *Annals of Nuclear Energy*, 31:1833–1865, 2004.

[2] George Keith Batchelor. *An Introduction to Fluid Dynamics*. Cambridge University Press, 1994.

[3] Leon M. R. de Lima, Norberto Mangiavacchi, José Pontes, and J. Fontoura. Laterally averaged 2d model for thermal stratification simulations in reservoir environments. In *Anais do XX Congresso Brasileiro de Engenharia Mecânica (COBEM2009)*, Gramado, RS, 2009. CD-ROM.

[4] Odilon A. Camargo do Amarante, Michael Brower, John Zack, and Antonio Leite de Sá. Atlas do potencial eólico brasileiro. Technical report, CRESESB/CEPEL, 2001.

[5] Gustavo Rabello dos Anjos. Solução do campo hidrodinâmico em células eletroquímicas pelo método de elementos finitos. Master's thesis, COPPE/UFRJ, Março 2007.

[6] J. B. R. Loureiro. *Escoamento Turbulento sobre Colinas Abruptas Lisas e Rugosas com Extensas Regiões de Separação*. Tese de doutorado, COPPE/UFRJ, Rio de Janeiro - RJ, 2008.