## Centralized State Estimation of Distributed Maritime Autonomous Surface Oceanographers \*

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#### 1. INTRODUCTION

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## 1.1 A subsection

Bifurcation: Plot of local maxima of x with damping a decreasing (Fig. 1).

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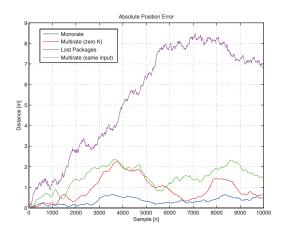


Fig. 1. Bifurcation: Plot of local maxima of x with damping a decreasing

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## 2. PROCEDURE FOR PAPER SUBMISSION

Next we see a few subsections.

## 2.1 Review Stage

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<sup>\*</sup> This work was supported in part by the National Technological Agency. (sponsor and financial support acknowledgment goes here). Paper titles should be written in uppercase and lowercase letters, not all uppercase.

Some words might be appropriate describing equation (1), if we had but time and space enough.

$$\frac{\partial F}{\partial t} = D \frac{\partial^2 F}{\partial x^2}.\tag{1}$$

See Able [1956], Able et al. [1954], Keohane [1958] and Powers [1985].

A subsubsection This equation goes far beyond the celebrated theorem ascribed to the great Pythagoras by his followers.

Theorem 1. The square of the length of the hypotenuse of a right triangle equals the sum of the squares of the lengths of the other two sides.

**Proof.** The square of the length of the hypotenuse of a right triangle equals the sum of the squares of the lengths of the other two sides.

#### 2.2 Final Stage

Authors are expected to mind the margins diligently. Conference papers need to be stamped with conference data and paginated for inclusion in the proceedings. If your manuscript bleeds into margins, you will be required to resubmit and delay the proceedings preparation in the process.

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All dimensions are in *centimeters*.

Margin settings			
Page	Top	Bottom	Left/Right
First	3.5	2.5	1.5
Rest	2.5	2.5	1.5

It is very important to maintain these margins. They are necessary to put conference information and page number for the proceedings.

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If you are using Word, use either the Microsoft Equation Editor or the MathType add-on for equations in your paper (Insert | Object | Create New | Microsoft Equation or MathType Equation). Float over text should not be selected. Of course LaTeX manages equations through built-in macros.

#### 4. UNITS

Use either SI as primary units. Other units may be used as secondary units (in parentheses). This applies to papers in data storage. For example, write  $15Gb/cm^2$  ( $100Gb/in^2$ ). An exception is when English units are used as identifiers in trade, such as 3.5 in disk drive. Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity in an equation. The SI unit for magnetic field strength H is A/m. However, if you wish to use units of T, either refer to magnetic flux density B or magnetic field strength symbolized as  $\mu_0 H$ . Use the center dot to separate compound units, e.g.,  $A \cdot m^2$ .

#### 5. HELPFUL HINTS

#### 5.1 Figures and Tables

Figure axis labels are often a source of confusion. Use words rather than symbols. As an example, write the quantity Magnetization, or Magnetization M, not just M. Put units in parentheses. Do not label axes only with units. As in Fig. 1, for example, write Magnetization (A/m) or Magnetization (A m?1), not just A/m. Do not label axes with a ratio of quantities and units. For example, write Temperature (K), not Temperature/K.

Multipliers can be especially confusing. Write Magnetization (kA/m) or Magnetization (103 A/m). Do not write Magnetization (A/m)? 1000 because the reader would not know whether the top axis label in Fig. 1 meant 16000 A/m or 0.016 A/m. Figure labels should be legible, approximately 8 to 12 point type.

## 5.2 References

Use Harvard style references (see at the end of this document). If you are using LaTeX, you can process an external bibliography database or insert it directly into the reference section. Footnotes should be avoided as far as possible. Please note that the references at the end of this document are in the preferred referencing style. Papers that have not been published should be cited as unpublished. Capitalize only the first word in a paper title, except for proper nouns and element symbols.

## 5.3 Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have already been defined in the abstract. Abbreviations such as IFAC, SI, ac, and dc do not have to be defined. Abbreviations that incorporate periods should not have spaces: write C.N.R.S., not C. N. R. S. Do not use abbreviations in the title unless they are unavoidable (for example, IFAC in the title of this article).

## 5.4 Equations

Number equations consecutively with equation numbers in parentheses flush with the right margin, as in (1). First use the equation editor to create the equation. Then select the Equation markup style. Press the tab key and write the equation number in parentheses. To make your equations more compact, you may use the solidus ( / ), the exp function, or appropriate exponents. Use parentheses to avoid ambiguities in denominators. Punctuate equations when they are part of a sentence, as in

$$\int_{0}^{r_{2}} F(r,\varphi)drd\varphi = \left[\sigma r_{2}/(2\mu_{0})\right]$$

$$\cdot \int_{0}^{\inf} exp(-\lambda|z_{j}-z_{i}|)\lambda^{-1}J_{1}(\lambda r_{2})J_{0}(\lambda r_{i})d\lambda$$
(2)

Be sure that the symbols in your equation have been defined before the equation appears or immediately following. Italicize symbols (T might refer to temperature, but T is the unit tesla). Refer to (1), not Eq. (1) or equation (1), except at the beginning of a sentence: Equation (1) is

#### 5.5 Other Recommendations

Use one space after periods and colons. Hyphenate complex modifiers: zero-field-cooled magnetization. Avoid dangling participles, such as, Using (1), the potential was calculated. [It is not clear who or what used (1).] Write instead, The potential was calculated by using (1), or Using (1), we calculated the potential.

A parenthetical statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.) Avoid contractions; for example, write do not instead of dont. The serial comma is preferred: A, B, and C instead of A, B and C.

## 6. CONCLUSION

A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

#### ACKNOWLEDGEMENTS

Partially supported by the Roman Senate.

## REFERENCES

- B.C. Able. Nucleic acid content of microscope. *Nature*, 135:7–9, 1956.
- B.C. Able, R.A. Tagg, and M. Rush. Enzyme-catalyzed cellular transanimations. In A.F. Round, editor, Advances in Enzymology, volume 2, pages 125–247. Academic Press, New York, 3rd edition, 1954.
- R. Keohane. Power and Interdependence: World Politics in Transitions. Little, Brown & Co., Boston, 1958.
- T. Powers. Is there a way out? *Harpers*, pages 35–47, June 1985.
- A. H. Soukhanov, editor. The American Heritage. Dictionary of the American Language. Houghton Mifflin Company, 1992.

# Appendix A. A SUMMARY OF LATIN GRAMMAR Appendix B. SOME LATIN VOCABULARY