

Title of Mechatronics and Robotics Project Report

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Abstract—This document is a model and instructions for the final report of Mechatronics and Robotics (MR) project using L^AT_EX. This and the style file, IEEEtran.cls, define the components of your paper [title, text, heads, etc.]. *CRITICAL: Do Not Use Symbols, Special Characters, Footnotes, or Math in Paper Title or Abstract.

Index Terms—add five keywords, formatting, style, styling, insert

I. INTRODUCTION

This template provides authors with most of the formatting specifications needed for preparing electronic versions of their papers. The IEEE conference paper template is taken as a basis while there are some minor rules of writing need to be considered, which was discussed in the lecture “How to conduct research and write a report”. Please check the material so that your report is well structured and presented your achievements in the project. The total page number should be from 6 to 8 pages for a brief description of your project. If there is additional information you want to write, please provide them a separated appendix document. There is no format and limitation in page number for this appendix.

II. BASICS

All standard paper components have been specified for three reasons: (1) ease of use when formatting individual papers, (2) automatic compliance to electronic requirements that facilitate the concurrent or later production of electronic products, and (3) conformity of style throughout reports. Margins, column widths, line spacing, and type styles are built-in; examples of the type styles are provided throughout this document and are identified in italic type, within parentheses, following the example. The student may need to create necessary components, incorporating the applicable criteria that follow.

A. Page Setting

First, confirm that you have the correct template for your paper size. This template has been tailored for output on the A4 paper. Please do not use it for US-letter paper size since the margin requirements for A4 papers may be different from A4 paper.

B. Filename of the Final Report

The file name is set to the initial of the author, course initial of “MR”, academic year, semester (WS- winter semester and SS- summer semester), and short title of project

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without space. For example, the first author is Student LastName, then “SL_MR2022WS_ProjectShortTitle.tex” to generate “SL_MR2022WS_ProjectShortTitle.pdf”

C. Languages

You can use either German or English. Discuss it in advance with your supervisor.

D. Submission with the Final Report

With the final report, students are asked to submit all files related to the projects, e.g. or any related documents and files for design, simulation, materials, datasheet of used systems, and so on. This will help us to achieve your work for further development of the project and will also help new students who want to continue your project. Please achieve it as a zip file and give it to the supervisor so that he can upload the results in the ACIN network drive.

E. Maintaining the Integrity of the Specifications

The template is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin in this template measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations

III. PREPARE YOUR PAPER BEFORE STYLING

Before you begin to format your paper, first write and save the content as a separate text file. Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph.

Finally, complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar:

A. Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

B. Units

- Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as “3.5-inch 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 that you use in an equation.
- Do not mix complete spellings and abbreviations of units: “Wb/m²” or “webers per square meter”, not “webers/m²”. Spell out units when they appear in text: “...a few henries”, not “...a few H”.
- Use a zero before decimal points: “0.25”, not “.25”. Use “cm³”, not “cc”. (bullet list)

C. Equations

The equations are an exception to the prescribed specifications of this template. You will need to determine whether or not your equation should be typed using either the Times New Roman or the Symbol font (please no other font). To create multileveled equations, it may be necessary to treat the equation as a graphic and insert it into the text after your paper is styled. Number equations consecutively. Equation numbers, within parentheses, are to position flush right, as in (1), using a right tab stop. To make your equations more compact, you may use the solidus (/), the exp function, or appropriate exponents. Italicize Roman symbols for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in

$$\alpha + \beta = \chi, \quad (1)$$

where α denotes Define

$$\begin{aligned} \zeta &= \alpha - \beta \\ &= \chi - 2\beta. \end{aligned} \quad (2)$$

Note that the equation is centered using a center tab stop. Be sure that the symbols in your equation have been defined before or immediately following the equation. Use “(1)”, not “Eq. (1)” or “equation (1)”, except at the beginning of a sentence: “Equation (2) is...”

D. \LaTeX -Specific Advice

Please use “soft” (e.g., `\eqref{Eq}`) cross references instead of “hard” references (e.g., (1)). That will make it possible to combine sections, add equations, or change the order of figures or citations without having to go through the file line by line.

Please don’t use the `{eqnarray}` equation environment. Use `{align}` or `{IEEEeqnarray}` instead. The `{eqnarray}` environment leaves unsightly spaces around relation symbols.

Please note that the `{subequations}` environment in \LaTeX will increment the main equation counter even when there are no equation numbers displayed. If you forget that, you might write an article in which the equation numbers skip from (17) to (20), causing the copy editors to wonder if you’ve discovered a new method of counting.

\BibTeX does not work by magic. It doesn’t get the bibliographic data from thin air but from .bib files. If you use \BibTeX to produce a bibliography you must send the .bib files.

\LaTeX can’t read your mind. If you assign the same label to a subsection and a table, you might find that Table I has been cross referenced as Table IV-B3.

\LaTeX does not have precognitive abilities. If you put a `\label` command before the command that updates the counter it’s supposed to be using, the label will pick up the last counter to be cross referenced instead. In particular, a `\label` command should not go before the caption of a figure or a table.

Do not use `\nonumber` inside the `{array}` environment. It will not stop equation numbers inside `{array}` (there won’t be any anyway) and it might stop a wanted equation number in the surrounding equation.

E. Some Common Mistakes

- The word “data” is plural, not singular.
- The subscript for the permeability of vacuum μ_0 , and other common scientific constants, is zero with subscript formatting, not a lowercase letter “o”.
- In American English, commas, semi-colons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
- A graph within a graph is an “inset”, not an “insert”. The word alternatively is preferred to the word “alternately” (unless you really mean something that alternates).
- Do not use the word “essentially” to mean “approximately” or “effectively”.
- In your paper title, if the words “that uses” can accurately replace the word “using”, capitalize the “u”; if not, keep using lower-cased.
- Be aware of the different meanings of the homophones “affect” and “effect”, “complement” and “compliment”, “discreet” and “discrete”, “principal” and “principle”.
- Do not confuse “imply” and “infer”.
- The prefix “non” is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the “et” in the Latin abbreviation “et al.”.
- The abbreviation “i.e.” means “that is”, and the abbreviation “e.g.” means “for example”.

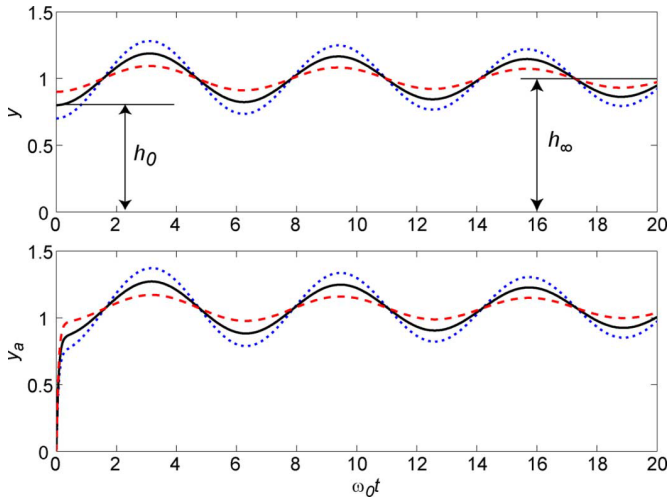


Fig. 1. Upper curves: Simulated step response of the scanner in Z-direction for $\zeta = 0.02$ and $\alpha = 0.7$ (dotted blue line), 0.8 (solid black line) and 0.9 (dashed red line). The lower curves show the step response when a time constant of the piezo amplifier of $\tau = 0.07/\omega_0$ is added [1]. For images, If possible, try to use **vector images (eps files)** as much as possible with embedded fonts.

TABLE I
TABLE TYPE STYLES

Table Head	Table Column Head		
	Table column subhead	Subhead	Subhead
copy	More table copy ^a		

^aSample of a Table footnote.

IV. FURTHER USE OF THE TEMPLATE

Use this sample document as your LaTeX source file to create your document. Save this file, for example, as root.tex. You have to make sure to use the cls file that came with this distribution. If you use a different style file, you cannot expect to get required margins. Note also that when you are creating your out PDF file, the source file is only part of the equation.

A. Headings, etc

Text heads organize the topics on a relational, hierarchical basis. For example, the paper title is the primary text head because all subsequent material relates and elaborates on this one topic. If there are two or more sub-topics, the next level head (uppercase Roman numerals) should be used and, conversely, if there are not at least two sub-topics, then no subheads should be introduced. Styles named “Heading 1”, “Heading 2”, “Heading 3”, and “Heading 4” are prescribed.

B. Figures and Tables

Positioning Figures and Tables: Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation “Fig. 1”, even at the beginning of a sentence.

Figure Labels: Use 8 point Times New Roman for Figure labels, which is managed in the style file of latex. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity “Magnetization”, or “Magnetization, M”, not just “M”. If including units in the label, present them within parentheses. Do not label axes only with units. In the 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.”

C. References

Please number citations consecutively within brackets [1]. The sentence punctuation follows the bracket [2]. Refer simply to the reference number, as in [3]—do not use “Ref. [3]” or “reference [3]” except at the beginning of a sentence: “Reference [3] was the first ...”

Number footnotes separately in superscripts. Place the actual footnote at the bottom of the column in which it was cited. Do not put footnotes in the abstract or reference list. Use letters for table footnotes.

Papers that have not been published, even if they have been submitted for publication, should be cited as “unpublished” [4]. Papers that have been accepted for publication should be cited as “in press” [5]. Capitalize only the first word in a paper title, except for proper nouns and element symbols. The multiple reference should be merged together, i.e. [1]–[3]. For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation.

V. CONCLUSION

A conclusion section is required in the report. 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.

APPENDIX

If Appdendix is required, please do not add appendix in this report but provide it as a separated document.

REFERENCES

- [1] G. Schitter, K. J. Astrom, B. E. DeMartini, P. J. Thurner, K. L. Turner, and P. K. Hansma, “Design and Modeling of a High-Speed AFM-Scanner,” *IEEE Transactions on Control Systems Technology*, vol. 15, no. 5, pp. 906–915, Sep. 2007.
- [2] A. V. Oppenheim, A. S. Willsky, and S. H. Nawab, *Signals & systems*, 2nd ed. USA: Prentice-Hall, Inc., 1996.
- [3] R. Munnig Schmidt, G. Schitter, A. Rankers, and J. van Eijk, *The Design of High Performance Mechatronics: 2nd Edition. High-Tech Functionality by Multidisciplinary System Integration*, 2nd ed. USA: Delft University Press, 2014.
- [4] G. Biagetti, P. Crippa, L. Falaschetti, and C. Turchetti, “Discrete bessell functions for representing the class of finite duration decaying sequences,” in *2016 24th European Signal Processing Conference (EUSIPCO)*, Aug. 2016, pp. 2126–2130.
- [5] Volkswagen, “LV 124: Electric and electronic components in motor vehicles up to 3.5 t - general requirements, test conditions and tests (VW 80000),” Tech. Rep. 8MA00, 2013.