THESIS TITLE

by

Name Surname

B.S., Program Name, Boğaziçi University, 20XX

M.S., Program Name, Boğaziçi University, 20XX

Submitted to

the Institute for Data Science and Artificial Intelligence

in partial fulfillment of

the requirements for the degree of

Master of Science/Doctor of Philosophy

Graduate Program in Data Science and Artificial Intelligence

Boğaziçi University

20XX

THESIS TITLE

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Prof. Name Surname (Thesis Supervisor)	.....
Assoc. Prof. Name Surname	.....
Assist. Prof. Name Surname	.....
Name Surname, Ph.D.	.....

DATE OF APPROVAL: DD.MM.YYYY

ACKNOWLEDGEMENTS

Acknowledgements come here...

ABSTRACT

THESIS TITLE

One page abstract will come here.

ÖZET

TEZ BAŞLIĞI

Bir sayfa uzunluğunda özet gelecektir.

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LIST OF SYMBOLS

a_{ij}	Description of a_{ij}
$\mathbf{A}$	State transition matrix of a hidden Markov model
α	Blending parameter *or* scale
$\beta_t(i)$	Backward variable
Θ	Parameter set

LIST OF ACRONYMS/ABBREVIATIONS

2D	Two Dimensional
3D	Three Dimensional
AAM	Active Appearance Model
ASM	Active Shape Model

1. INTRODUCTION

The requirements and explanations presented in the following pages aim to provide guidance to graduate students preparing theses to be submitted to the Institute for Data Science and Artificial Intelligence at Boğaziçi University (henceforth referred to as 'the Institute'). These guidelines are not intended, however, as a complete manual for the writing of theses.

Every thesis must comply with grammatical and formatting rules and must possess clarity of expression. The responsibility for such compliance and clarity rests primarily upon the candidate; nevertheless, every thesis should be scrutinized for these qualities by the student's Thesis Supervisor and the Defense Jury.

2. FORMAT

2.1. Character Fonts

Text should be typed in Times, Times New Roman or Computer Modern (standard serif font provided by LaTeX). The font size must be 12 points in the text including formulas, equations, Table headings, Table and Figure captions. Text appearing in Figures and Tables, as well as the text used in superscripts or subscripts, should be at least 8 points. Footnotes, long biographical quotes and extensive quotations should be 10 points.

2.2. Spacing

Spacing of the text material should be 1.5 or, when necessary, integer multiples thereof. The following are exceptions:

- Footnotes: single spacing
- Long biographical quotes: single spacing
- Extensive quotations: single spacing and indented 1 cm relative to the text material.
- Equations and equation arrays: single spacing before and after,
- Footnotes: single spacing,
- Long biographical quotes: single spacing,
- Extensive quotations: single spacing and indented 1 cm relative to the text material.

Spacing of figures is given in the ordered list below:

(i) Last line of a paragraph,
(ii) One line of empty space,
(iii) Figure,
(iv) One line of empty space,
(v) Figure Caption ,
(vi) One line of empty space,
(vii) First line of a new paragraph.

Spacing of tables is given in the ordered list below:

(i) Last line of a paragraph,
(ii) One line of empty space,
(iii) Table caption,
(iv) Half a line of empty space,
(v) Table,
(vi) One line of empty space,
(vii) First line of a new paragraph.

These spacing may be handed automatically by latex, but not always guaranteed. You should also check manually your thesis for this spacing order

2.3. Centering

The center point of titles and headings should be 112 mm from the left edge of the paper or 98 mm from the right edge. This can be accomplished via the standard centering commands in editors such as Microsoft Word and LaTeXafter margins are set as per explained in the following section. Centering manually is *not* recommended practice because it is prone to errors.

2.4. Margins

Margins of pages should conform to the following specifications:

- Left margin: 3.5 cm from the left edge of the paper
- Right margin: 2 cm from the right edge of the paper
- Top margin: 3.5 cm from the top edge of the paper (page numbers must be 2 cm from the top edge of the paper)
- Bottom margin: (at least) 2 cm from the bottom edge of the paper

Figures and Tables should also adhere to these margins. Folded pages will not be accepted unless there is absolutely no other way for the material to be presented.

2.5. Pagination

Each page in the thesis should bear a page number except for the title page and the pages on which a Figure or a Table is placed in landscape orientation. Only one side of the paper should be used.

The preliminary section comprising the Title Page, Page of Approval, Dedication Page (if present), Acknowledgements Page (if present) and the other pages in Table 2.1 should be numbered, using lower case Roman numerals (i.e. i, ii, iii, ...). The Title Page counts as page i but the page number is not printed. The preliminary section must follow the sequence shown in Table 2.1. An example of this sequence is provided in Appendix A.

Table 2.1. Pagination Table: Page numbers are given as an example where each part takes only one page.

Page Title	**Number**
(Title Page)	Page i (number does not appear)
(Page of Approval)	Page ii
(Dedication)	Page iii (if present)
ACKNOWLEDGEMENTS	Page iv (if present)
ABSTRACT	Page v
ÖZET	Page vi
TABLE OF CONTENTS	Page vii
LIST OF FIGURES	Page viii (if present)
LIST OF TABLES	Page ix (if present)
LIST OF SYMBOLS	Page x (if present)
LIST OF ACRONYMS/ABBREVIATIONS	Page xi (if present)

For the remainder of the thesis, Arabic numerals should be used. Each page should be numbered unless there is a full-page landscape Figure or Table present on a page; page numbers are not printed on such pages, but the numbers continue to increment. Page numbers should to be placed two centimeters from the top and the right edges of the pages and they should be in 12 points. Use of suffixes (such as 25a, 25b, etc.) or punctuation (such as a dash or a period) is not permitted in page numbers. The numbering in the main body of the thesis should begin with page 1 and run consecutively to the last page.

2.6. Headings

Headings should be in the same font as the rest of the text and should feature no quotation nor punctuation marks other than the period following the Heading number. There may be at most four levels of Headings: Main Headings, Second Headings,

First Subheadings and Second Subheadings. Additionally, special captions to designate Theorems, Corollaries, Lemmas, Definitions, Remarks and Propositions may be deployed.

Headings should be followed by at least one line of text (i.e. Headings should not directly be followed by Tables or Figures).

Table 2.2. Summary of Heading specifications.

Main Headings	centered	capital letters	bold face	14 pt	no period at the end
Second Headings	centered	title case letters	bold face	12 pt	no period at the end

2.6.1. Main Headings

Main Headings should be numbered as 1., 2., ..., and they should comply with the following rules:

- Main Headings should begin a new page and should be centered according to Section 2.3. They should be typed in bold face and should be in capital letters and in 14 points. There should be no period at the end of the heading text.
- Main Headings should reflect the content of the text that follows. Main Headings are not to be called as chapters.
- Heading number should be followed by a period and two spaces.
- Main Headings should be separated from the succeeding text or second heading by two empty lines of text.

2.6.2. Second Headings

Second Headings should be numbered as 2.1., 2.2., ..., and they should comply with the following rules:

- Second Headings should be centered according to Section 2.3 and be typed in 12 points, bold face and title case letters (i.e., the first letter of each word except conjunctions, prepositions and articles must be a capitalized). There should be no period at the end of the heading text.
- Heading number should be followed by a period and two spaces.
- Second headings should be separated from the preceding text or main heading and succeeding text or first subheading by two empty lines of text.

2.6.3. First Subheadings

First Subheadings should be numbered as 2.1.1., 2.1.2., ..., and they should comply with the following rules:

- First Subheadings should be typed in bold face in 12 points and with title case letters, beginning at the left margin of the text. There should be no period at the end of the heading text.
- Heading number should be followed by a period and two spaces.
- First Subheadings should be separated from the preceding text or second heading and succeeding text by one empty line of text.

2.6.4. Second Subheadings

Second Subheadings should be avoided if possible. If they can't be avoided, they should be numbered as 2.1.1.1., 2.1.1.2., ..., and they should comply with the following rules:

- Second Subheadings should be aligned with the left margin of the text (with no indent), should be typed in 12 points and in title case letters, and they should be underlined.
- Heading number should be followed by a period and two spaces.
- Heading text should be followed by a period and the leading text.
- Second Subheadings should be separated from the preceding text or First Subheading by an empty line of text.

2.6.5. Special Captions

Special captions may be deployed to initiate Theorems, Lemmas, Propositions, Corollaries and Definitions. Special captions should obey the following rules:

- Special captions should be bold and in 12 points, typed in title case letters.
- Special captions should be on the same line as their leading text, and they should be aligned with the left text margin (with no indent).
- Leading text appearing after a special caption should be in italics and not more than one paragraph.
- Each special caption should be succeeded with a numbering label in the form X.Y, where the first number X indicates the number of the current main heading and the second number Y starts with unity for each main heading and increases sequentially and separately for each caption type. For example, 3.5 would mean the fifth special caption of a certain type appearing under the third main heading (e.g. Theorem 3.5). When the main heading pertains to an Appendix, the first indicator is a letter such as A, B, ...
- For Theorems, Lemmas and Corollaries, a series of proof or remark blocks may follow. The first proof block should begin with the word *Proof* written in italics and followed by a period; the remaining text of the block and the following blocks are regular type. The last block in a Proof environment should terminate with a □ at the lower right corner.

2.7. Paragraphs

First lines of all paragraphs should be indented by one centimeter. A new paragraph should not begin at the bottom of a page unless *at least two lines* of the paragraph may be printed on that page. Each paragraph should be separated from the preceding and succeeding paragraphs by an empty line of text.

2.8. List Items

Lists composed of successive lines of text or paragraphs may, for clarity, be preceded by a bullet (•) or enumerated as (i), (ii), (iii), etc.

Bold face or italic characters should not be used in list items. Certain information such as enzyme lists and lists of chemical supplies should be presented in tables rather than paragraph lists.

Second level of list items are permitted and they must be preceded by a bullet if the first level items are enumerated; on the other hand, if the first level items are preceded by a bullet, then the second level items must be enumerated.

Third level list items are not allowed.

2.9. Footnotes

Footnotes should be avoided whenever possible. If and when they must be used, they should comply with the following rules.

- Footnote references should be indicated in the text by a superscript Arabic number immediately following the word, phrase or sentence which the footnote concerns.
- Footnotes should be sequentially numbered on each page and in the entire thesis.

- Footnotes should be placed at the bottom of the page on which they are indicated. They should be indented from the left margin of the text by one centimeter and should be separated from the main text by a short horizontal line. Footnotes should be single-spaced and 10 points.

2.10. Bibliographical Material

The references are listed in the bibliography in the order of appearance in the text and they are numbered accordingly using Arabic numerals as 1., 2. ... (this will be referred to as the "enumerated reference list"). The numerical reference of bibliographical material should be indicated in the text by an Arabic numeral in square brackets (for example "[8]") placed in the text immediately following the name, word, phrase, or sentence which the reference concerns (in some cases, this may be the author's name). When two bibliographical references are to be cited, they should be separated by a comma (for example "[8,9]"); when three or more consecutive bibliographical references are to be cited, the first and the last should be given, separated by a dash line (for example "[8-12]", "[6], [8-12], [17]").

In the References section, references which do not exceed 10 authors must be written openly. "et al." expression can only be used when there are more than 10 authors for a reference.

2.10.1. Enumerated Reference Lists

The following schemes should be used in the enumerated reference lists:

Books:

1. Firstauthorsurname, F.A. and S.A. Surname, *Title of the Book*, Second Edition (only if other than the first), Publisher Name, City, Year.

2. Ross, S., *A First Course in Probability*, Seventh Edition, Pearson Prentice Hall, New Jersey, 2006.

3. Ang, A.H-S. and W.H. Tang, *Probability Concepts in Engineering*, John Wiley & Sons, New Jersey, 2007.

4. Ang, A.H-S., W.H. Tang and S. Ross, *Probability Concepts in Engineering*, John Wiley & Sons, New Jersey, 2007.

Journal Articles:

1. Firstauthorsurname, F.A. and S.A. Surname, "Title of the Article", *Title of the Journal*, Vol. X, No. Y, page number (p. 5 or pp. 5-10), year of publication.

2. Maiers, J. and Y.S. Sherif, "Application of Fuzzy Set Theory", *IEEE Transactions on Systems, Man, and Cybernatics*, Vol. 15, No. 1, pp. 41-48, 1985.

Conference Proceedings:

1. Firstauthorsurname, F.A. and S.A. Surname, "Title of the Article", in *Title of the Proceedings*, Editors, Location, Vol. X (if exists), page number (p. 5 or pp. 5-10), year.

2. Brown, D. and D. Clair, "Integrated R-transportation", paper presented at the *14th International Conference of Transportation Logistics*, Istanbul, Turkey, 2008.

Dissertations:

1. Authorsurname, F.A., *Title of the Dissertation*, Level (Ph.D. Thesis or M.S. Thesis), Name of Higher Education Institute, Year.

2. İşgüder, E., *Human Computer Interaction in the 21st Century*, M.S. Thesis, Boğaziçi University, 2015.

3. İşgüder, E., *Human Computer Interaction in the 22st Century*, Ph.D. Thesis, Boğaziçi University, 2021.

Websites:

1. Authorsurname, F.A. AND/OR Name of Authoring Body/Organization, "Title of the Web Material", Publishing Year, URL, last access date.

2. Sarp, B., "Observations", 2001, http://sarp.com.tr/obs.html, accessed on November 21, 2015.

3. Wikipedia, "John von Neumann", http://en.wikipedia.org/wiki/John_von_Neumann, accessed on October 30, 2015.

4. Wikipedia, http://en.wikipedia.org/, accessed on October 29, 2015.

5. http://encyclopedia.org/, accessed on October 21, 2015.

Patents:

1. Lastname F., "Title of Patent", U.S. Patent Number, Month Day, Year. Available: URL or Database Name, Accessed on: Month Day, Year.

2. Shatner W., L. a. Christel, D. A. Borkholder and S. J. Young, "Apparatus for Analysis of a Nucleic Acid Amplification Reaction", U.S. Patent 6942971 B2, September 13, 2005. https://www.google.com/patents/US6942971, Accessed on December 12, 2017.

Manuals:

1. Name of Manual/Handbook, xth ed. Name of Comp., Country, Month. Year, pp. xxx-xxx (pages if relevant). Accessed on: Month, Day, Year. [Online].site/path/file

2. The MakerBot Replicator Desktop 3D Printer (Fifth Generation Model) User Manual, MakerBot Industries, Brooklyn, NY, 2014.

Preprints:

1. Authorsurname, F.A., "Title of the Material", arxiv Preprint number, Publishing Year.

2. Nettelblahd J. and C. Nettelblahd, "CannyFS: Opportunistically Maximizing I/O Throughput Exploiting the Transactional Nature of Batch-Mode Data Processing", arXiv:1612.06830 [cs], 2016.

2.10.2. Surname Reference Lists

The following schemes should be used in the surname reference lists:

Books:

Firstauthorsurname, F.A. and S.A. Surname, Year *Title of the Book*, Second Edition (only if other than the first), Publisher Name, City.

Ross, S., 2006, *A First Course in Probability*, Seventh Edition, Pearson Prentice Hall, New Jersey.

Ang, A.H-S. and W.H. Tang, 2007, *Probability Concepts in Engineering*, John Wiley & Sons, New Jersey.

Ang, A.H-S., W.H. Tang and S. Ross, 2007, *Probability Concepts in Engineering*, John Wiley & Sons, New Jersey.

Journal Articles:

Firstauthorsurname, F.A. and S.A. Surname, year of publication, "Title of the Article", *Title of the Journal*, Vol. X, No. Y, page number (p. 5 or pp. 5-10).

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Brown, D. and D. Clair, 2008, "Integrated R-transportation", paper presented at the *14th International Conference of Transportation Logistics*, Istanbul, Turkey.

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Authorsurname, F.A., Year, *Title of the Dissertation*, Level (Ph.D. Thesis or M.S. Thesis), Name of Higher Education Institute, Year.

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İşgüder, E., 2021, *Human Computer Interaction in the 22st Century*, Ph.D. Thesis, Boğaziçi University.

Websites:

Authorsurname, F.A. AND/OR Name of Authoring Body/Organization, Publishing Year, "Title of the Web Material", URL, last access date.

Sarp, B., 2001, "Observations", http://sarp.com.tr/obs.html, accessed on November 21, 2015.

Wikipedia, “John von Neumann”, http://en.wikipedia.org/wiki/John_von_Neumann, accessed on October 30, 2015.

Wikipedia, http://en.wikipedia.org/, accessed on October 29, 2015.

http://encyclopedia.org/, accessed on October 21, 2015.

Patents:

Lastname F., Year, ”Title of Patent”, U.S. Patent Number. Available: URL or Database Name, Accessed on: Month Day, Year.

Shatner W., L. a. Christel, D. A. Borkholder and S. J. Young, 2005, “Apparatus for Analysis of a Nucleic Acid Amplification Reaction”, U.S. Patent 6942971 B2, September 13, 2005. https://www.google.com/patents/US6942971, Accessed on December 12, 2017.

Manuals:

Name of Manual/Handbook, Year, xth ed. Name of Comp., Country, pp. xxx-xxx (pages if relevant). Accessed on: Month, Day, Year. [Online].site/path/file

The MakerBot Replicator Desktop 3D Printer (Fifth Generation Model) User Manual, 2014, MakerBot Industries, Brooklyn, NY.

Preprints:

Authorsurname, F.A., Publishing Year, “Title of the Material”, arXiv Preprint number.

Nettelblahd J. and C. Nettelblahd, 2016, "CannyFS: Opportunistically Maximizing I/O Throughput Exploiting the Transactional Nature of Batch-Mode Data Processing", arXiv:1612.06830 [cs].

2.11. Mathematical Expressions

Mathematical expressions such as equations, formulas, etc. should be typeset in accordance with the following rules:

- Mathematical symbols and expressions within the text should be written with the same font used in the equation or equation array environments in order to separate them from the regular text. Italic font is the typical choice.

- Mathematical expressions, equations and equation arrays should be part of the text and should not be treated as images or floating objects. This means that i) they should be placed with one line spacing between the preceding and following text, ii) if they finish the sentence they should be ended with a full stop (.), iii) if the sentence continues after the mathematical expression it should not have a paragraph indentation or it should not start with a capital letter.

- Multiple equations or mathematical expressions should be written in an equation array environment. This guarantees the single line spacing between these expressions. In equation arrays, the individual lines should be aligned such that the first equality (or inequality or similarity) signs are in line with each other.

- Mathematical expressions should be referred to after they appear first and not before. Try to avoid from forward referencing.

  This equation template should be followed strictly. You can see detailed examples in the Examples section.

2.12. Tables and Figures

All floating items such as graphs, charts, photographs, illustrations and lists should be considered and designated as a Figure or a Table, whichever is appropriate. To ensure acceptable print, all drawings, graphs, illustrations and similar graphical material should be prepared with sufficient resolution. All text in Figures and Tables should be clearly legible with and should appear in at least 8 points.

All Tables and Figures should be captioned and enumerated in the form "X.Y" wherein "X" refers to the number (or letter, if in Appendix) of the current Main Heading, and "Y" increases sequentially staring with unity at each Main Heading, separately for Figures and Tables. Table captions should be located above the Tables whereas Figure captions should be placed below the Figures. All captions should include the label and the number followed by a period and a space (such as "Table 3.1. " or "Figure A.1. " if in appendix), followed by an explanatory text referring to the content of the Table or Figure. Only the first word of the caption text should be capitalized and the text should end with a period; it should not be boldface or italic.

All Figures, Tables and their captions should be centered in accordance with Section 2.3. Captions should continue at most for 5 lines. Further explanation should be provided in the main text. Reference to a Figure/Table may come before or after the Figure/Table as long as the reference is clearly indicated and understood. If there are too many consecutive and related Figures/Tables, they should be presented in the appendix.

When a Figure contains sub-figures, each sub-figure must be marked with a lowercase letter in parenthesis starting with "(a)". There is to be a single caption for the whole Figure within which each sub-figure is explicitly referred to and explained (such as "Figure 3.8. (a) The picture, (b) the bigger picture.").

Figures should not be divided to and continued on multiple pages. When a Table is divided into two or more pages, each part should have the same label, number and text

in its caption, but the captions of the second and the latter parts should end with the expression "(cont.)." to indicate continuation.

When a Table or a Figure is referenced in the text, the reference should include the label and the number with the first letter of the label in capital case (such as "Table 4.5" or "Figure 3.8" - note that no period is placed after the number). A sub-figure may be directly referenced by indicating its label, number and sequence (such as "Figure 3.8a" or "Figure 3.8a and c").

All Tables should be framed, both externally and internally, with single-line borders. Tables should not have any background color, and the text fonts used in the Tables should be consistent with the rest of the text. Table headers may be boldface but colored texts are not allowed in these headers. Figures may be colored where necessary. Figures should not have an embedded title in the graphics/charts/photographs/etc., and the Figure caption should include all the necessary information.

All axes of graphs should have titles.

3. ARRANGEMENT

3.1. Title Page

The Title Page is the first page of the thesis. Please refer to the example for all pertinent details, including proper scaling and positioning. In particular,

- Page number should not be printed on the Title Page (whose page number is i).
- The title of the thesis should be centered and in all capital letters in 14 points.
- All prior higher education degrees of the candidate should be listed on the Title Page, showing the majors, the degree granting institutions and graduation years in chronological order.
- The submission requirement ("[...] of the requirements for the degree of Master of Science" or "[...] of the requirements for the degree of Doctor of Philosophy") should be specified.
- The name of the graduate program enrolled to and the year in which the thesis is approved should appear at the bottom of the Title Page.

3.2. Approval Page

All copies of the submitted thesis should include original signatures of the Defense Jury on the Approval Page. The Approval Page should appear right after the Title Page.

The names of the members of the Defense Jury should be listed in the alphabetical order of their surnames except for the Thesis Supervisor's, whose name should be the first one on the list. If a Co-Supervisor exists, her/his name should appear right after the Supervisor's. Titles of the Jury members should be presented in the North American style with either "Prof.", "Assoc. Prof." or "Assist. Prof." preceding a Jury member's name. If desired and appropriate, the term 'Ph.D.' may follow a Jury member's name (separated by a comma from the name). Space for the signature of each Jury member

should be left beside each name.

The date at the bottom of the Approval Page is the date at which the thesis is approved by the Defense Jury.

3.3. Dedication

Dedication is rare and it should be thought of as an honorific statement to explicitly recognize someone who has provided exceptional support to the author, especially in the completion of the thesis. The Dedication Page should come right after the Approval Page. Dedications should be simple phrases (such as 'To my mother."), in English, and placed at the lower right corner of the page.

3.4. Acknowledgements

The candidate may desire to include a page with a brief note of an acknowledgement of help received from particular people in the preparation of the thesis. All organizations proving financial support must be acknowledged and grant numbers should be included.

3.5. Abstract

The Abstract should briefly describe the thesis work including its objectives, methods, results and conclusions. Two abstracts, one in English and the other in Turkish, should be included. The Abstract should not contain headings, tabular material, chemical formulae, footnotes or references, but author citing is allowed. Each abstract should be at most one page long.

The Abstract Page should contain the title of the thesis. The Turkish Abstract ("Özet") must follow the English Abstract in the same format.

3.6. Table of Contents, List of Figures, List of Tables, List of Symbols and List of Acronyms/Abbreviations

Theses are expected to have a 'Table of Contents' for the convenience of the reader. The Table of Contents should not list itself.

If Figures and Tables are scattered throughout the text, a separate 'List of Figures' (and/or 'List of Tables') must be included after the Table of Contents. These lists should include page numbers.

Similarly, a 'List of Symbols' and/or 'List of Symbols/Abbreviations', whichever is appropriate, should be included. 'List of Symbols' should list symbols alphabetically as separate groups in the order of Latin symbols, Greek symbols, and other symbols. 'List of Accronyms/Abbreviations' should contain abbreviations listed alphabetically.

3.7. The Main Body of the Thesis

The main body of the thesis begins with the first Main Heading. The main body should be composed of a series of Main Headings, starting with an 'Introduction' and ending with a 'Conclusion'. The main body generally includes one or more of the following: 'Literature Survey', 'Problem Statement', 'Materials and Methods', 'Results and Discussions' or other relevant topics.

The first page of the first Main Heading should be the first page enumerated in Arabic numerals.

Attention should be paid to the precautions listed below:

- The whole text should be left and right justified.
- Please note the spelling of 'Foreword'.
- Periods, commas, semicolons and colons go outside the quotation marks.

- The word ‘data’ is plural and requires a plural verb.
- Integers from one to nine, inclusive, should be spelled out except when they represent a chapter or a section; for numbers 10 and above, use numerals. Numbers should be spelled out when they begin a sentence.
- Do not spell out per cent; use %.

3.8. Appendices

A thesis may present supporting data in the form of one or more Appendices. Examples of Appendix material include data sheets, questionnaire samples, flowcharts, illustrations, maps, software listings, charts, etc. If the appended data need to include oversized illustrations or maps, several alternative methods of inclusions are available.

If a Table, Figure, Equation etc., is to be included in an Appendix, the numbering should follow the same rules used within the main body of the thesis. In this case, however, the numbering should begin with the letter of the respective Appendix such as “Table A.1”, “Equation B.4” etc. Each Appendix should have a descriptive title, as should all Main Headings.

Software/computer programs developed in the thesis should be submitted on a separate CD. The format and contents of this CD is explained in Appendix B.

4. PREPARATION OF THE FINAL COPIES

4.1. Typesetting

Typesetting is generally accomplished using custom programs such as TEX, LATEX or Microsoft Word®. Template files may be provided by the Institute. It is the responsibility of the author to ensure that the typeset manuscript complies with the rules and regulations specified in this guide.

4.2. Paper Quality

The original copy should be printed on 75 or 80 gr/m^2, white, A4 paper. All reproduced copies should be of the same grade of paper.

4.3. Printer

The printer used in printing the thesis copies should provide high quality outputs such as laser or ink jet printers. Printer settings should comply with A4 and there should be no resizing of the page in printing.

4.4. Reproduction

Photocopy reproduction is acceptable while mimeographed or ditto copies are not acceptable for all parts or copies of the thesis submitted to the Institute or to the Library. Care should be taken to insure that the proper grade of paper is used at all times and that copying contrast is dark.

4.5. Binding

The thesis should be bound in dark blue, hard cover. The size of final, bound copy of the thesis should conform to A4 paper size. The name and surname of the candidate, the degree obtained and the year should be printed, in the order specified, on the spine of the cover. When the thesis is placed front cover up, the spine should read from left to right.

5. PUBLICATION OF THESES

5.1. Use of Copyrighted Material

The thesis author is solely responsible for use of any copyrighted material in the thesis.

Permission to quote extensively from copyrighted material or to reproduce a figure should be obtained by the thesis author from the author or the publisher of the copy righted material, whichever holds the copyright. Customarily, authorization is granted on the condition that proper acknowledgement is given. In some instances, however, the thesis author should keep on file the copyright granting permission to address possible future inquiries.

5.2. Publications

Theses or extracts thereof may be published in scholarly journals, proceedings, books or other media only upon release for publication by the major supervisor and provided proper credit is given to Boğaziçi University. No thesis may be published as such before it has been approved by the major supervisor. All theses and separately submitted abstracts are the property of Boğaziçi University.

As many theses will be important to other scholars and to a more general body of readers, candidates for degrees should plan for publication of their work.

6. EXAMPLES

Experiments and results come here...

6.1. Sample Section

Always place some text after headings before putting a graphics into a section as seen in Figure 6.1.

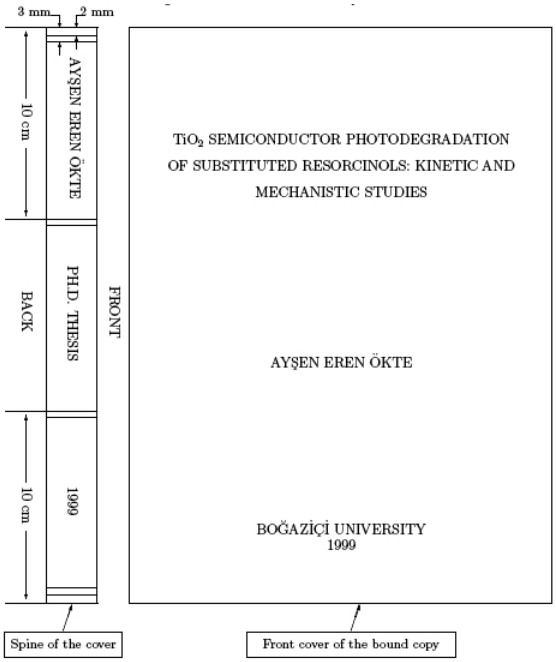


Figure 6.1. DSAI Booklet.

Also, below, you can find how to arrange figures that can span multiple pages.

Descriptive text explaining the continuation of Figure 6.2. Normally DSAI expects this page to be fully filled with content, hence the need for shifting text from following pages into here.

Now, let us cite some studies: one source as [1], two sources as [1,2] or you may cite three or more sources as [3–5]. Observe that they are ordered in the references chapter in the same order as they are cited. Both the IEEE referencing and APA referencing methods are allowed.



Figure 6.2. Sample Figure.



Figure 6.3. Sample Figure (cont.).

Let us put a sample table as seen in Table 6.1. Please pay attention that the caption is followed by a period.

Table 6.1. Sample table.

	Header 1	**Header 2**
Row 1	blah blah blah	blah blah blah
Row 2	blah blah blah	blah blah blah

Next up, there is a sample table that spans multiple pages. Normally the packages that are used for this breaks the formatting package provided by DSAI, but if done like this, you won't encounter the "package conflict" error.

Table 6.2. Sample table that spans multiple pages.

Header 1	**Header 2**
blah blah blah	blah blah blah
	blah blah blah
	blah blah blah
	blah blah blah
	blah blah blah
	blah blah blah
	blah blah blah
	blah blah blah
	blah blah blah
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	blah blah blah

Table 6.2. Sample table that spans multiple pages. (cont.)

Header 1	**Header 2**
blah blah blah	blah blah blah blah blah blah blah blah blah
blah blah blah	blah blah blah blah blah blah blah blah blah blah blah blah
blah blah blah	blah blah blah blah blah blah blah blah blah blah blah blah blah blah blah

You can use the code of Table 6.2 to create multiple page spanning longtables.

Footnotes should be avoided as possible. If there is an absolute necessity, footnotes should be used as this.[1] Please be informed that URLs are not allowed within thesis text, even in footnotes. Provide them as citations instead.

Item lists may be represented as follows:

- This is an item. Do not use boldface for the items.
  (i) This is a sub-item. Subsub-items are not allowed.
- Another item.

Item lists may also be represented as follows:

[1]Example of a footnote

(i) This is another enumerated item.

- This is another sub-item.

Good Equation Example 1:

"Notice that the spectral efficiency of the system is $R = n + m = \log_2(NM)$ bits per channel use (bpcu). At each transmission instant, each set of $n + m$ bits is split into groups of n and m bits." (Because the letters N, M, n, and m are used to denote some mathematical entities they are written in the math environment.)

Good Equation Example 2: The received signal is expressed as

$$\mathbf{y} = \mathbf{H}\boldsymbol{\Psi}\mathbf{x} + \boldsymbol{\nu} \tag{6.1}$$

where $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

Good Equation Example 3: The received signal is expressed as

$$\mathbf{y} = \mathbf{H}\boldsymbol{\Psi}\mathbf{x} + \boldsymbol{\nu}. \tag{6.2}$$

In this expression, $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

Good Equation Example 4 (Equation Group): Notice that under the signal model presented in the previous section, $\mathbf{z}$ forms a zero-mean proper complex Gaussian random vector with the mean vector, $\mathbf{m}_\mathbf{z}$, that can be written as

$$\begin{aligned} \mathbf{m}_\mathbf{z} &= \mathrm{E}[\mathbf{z}] = \sqrt{\frac{\rho K}{K+1}}\left(\bar{\mathbf{h}}_u \psi_u X_v - \bar{\mathbf{h}}_{\hat{u}} \psi_{\hat{u}} X_{\hat{v}}\right) \\ &= \sqrt{\frac{\rho K}{K+1}}\left(\bar{\mathbf{h}}_u a_u X_v e^{j\theta_u} - \bar{\mathbf{h}}_{\hat{u}} a_{\hat{u}} X_{\hat{v}} e^{j\theta_{\hat{u}}}\right) \end{aligned} \tag{6.3}$$

and the covariance matrix, $\mathbf{\Sigma_z}$, that can be computed as

$$\mathbf{\Sigma_z} = \frac{\rho\gamma(u, \hat{u}, v, \hat{v}, \psi_u, \psi_{\hat{u}})\mathbf{\Sigma}_r}{K+1} \tag{6.4}$$

where ρ and $\mathbf{\Sigma}_r$ are as defined before.

Good Equation Example 5:

The SINR for the users in $\hat{U}_1$, the SNR for the users in U_2 on each subcarrier n and the SNR for the remaining users in $\tilde{U}_1$ on each subcarrier k can be written as

$$\begin{aligned}
\Gamma_{\hat{U}_1}^{(n)} &= \frac{P_n|h_n|^2}{P_{N+n}|h_{N+n}|^2+\sigma^2} = \frac{P_t|g_n|^2}{\epsilon P_t|g_{N+n}|^2+\sigma^2} && (6.5)\\
\Gamma_{U_2}^{(n)} &= \frac{P_{N+n}|h_{N+n}|^2}{P_n|a_n-\hat{a}_n|^2|h_n|^2+\sigma^2} \\
&= \frac{\epsilon P_t|g_{N+n}|^2}{P_t|a_n-\hat{a}_n|^2|g_n|^2+\sigma^2} && (6.6)\\
\Gamma_{\tilde{U}_1}^{(k)} &= \frac{P_k|h_k|^2}{\sigma^2} = \frac{P_t|g_k|^2}{\sigma^2} && (6.7)
\end{aligned}$$

respectively, where $n \in \{1, ..., M\}$, $k \in \{M+1, ..., N\}$.

Bad Equation Example 1: (Extra space between the text and the mathematical expressions.)

The received signal is expressed as

$$\mathbf{y} = \mathbf{H\Psi x} + \boldsymbol{\nu} \tag{6.8}$$

where $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$

dimensional received signal and channel noise vectors, respectively.

Bad Equation Example 2: (Paragraph indent and/or capital letter use after an equation despite the fact that the sentence is continued.)

The received signal is expressed as

$$\mathbf{y} = \mathbf{H}\boldsymbol{\Psi}\mathbf{x} + \boldsymbol{\nu} \tag{6.9}$$

Where $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

Bad Equation Example 3: (Equation appearing as a floating object instead being attached to a sentence.)

The received signal is expressed as follows:

$$\mathbf{y} = \mathbf{H}\boldsymbol{\Psi}\mathbf{x} + \boldsymbol{\nu} \tag{6.10}$$

In this expression, $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

Bad Equation Example 4: (Spacing)

The SINR for the users in $\hat{U}_1$, the SNR for the users in U_2 on each subcarrier n and the SNR for the remaining users in $\tilde{U}_1$ on each subcarrier k can be written as

$$\Gamma_{\hat{U}_1}^{(n)} = \frac{P_n|h_n|^2}{P_{N+n}|h_{N+n}|^2 + \sigma^2} = \frac{P_t|g_n|^2}{\epsilon P_t|g_{N+n}|^2 + \sigma^2} \tag{6.11}$$

$$\Gamma_{U_2}^{(n)} = \frac{P_{N+n}|h_{N+n}|^2}{P_n|a_n - \hat{a}_n|^2|h_n|^2 + \sigma^2} = \frac{\epsilon P_t|g_{N+n}|^2}{P_t|a_n - \hat{a}_n|^2|g_n|^2 + \sigma^2} \tag{6.12}$$

$$\Gamma_{\tilde{U}_1}^{(k)} = \frac{P_k|h_k|^2}{\sigma^2} = \frac{P_t|g_k|^2}{\sigma^2} \tag{6.13}$$

respectively, where $n \in \{1, ..., M\}$, $k \in \{M+1, ..., N\}$.

Bad Equation Example 5: (Forward Referencing)

The received signal is expressed as in Equation (6.14) given below:

$$\mathbf{y} = \mathbf{H}\mathbf{\Psi}\mathbf{x} + \boldsymbol{\nu}. \tag{6.14}$$

$\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

Bad Equation Example 6:

The received signal is expressed as

$$\mathbf{y} = \mathbf{H}\mathbf{\Psi}\mathbf{x} + \boldsymbol{\nu}. \tag{6.15}$$

In Equation (6.15), $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the

$N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

7. CONCLUSION

The conclusions of the thesis should come here.

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Sarp, B., 2001, "Observations", http://sarp.com.tr/obs.html, accessed on November 21, 2015.

Shatner W., L. a. Christel, D. A. Borkholder and S. J. Young, 2005, "Apparatus for Analysis of a Nucleic Acid Amplification Reaction", U.S. Patent 6942971 B2, September 13, 2005. https://www.google.com/patents/US6942971, Accessed on December 12, 2017.

The MakerBot Replicator Desktop 3D Printer (Fifth Generation Model) User Manual, 2014, MakerBot Industries, Brooklyn, NY.

APPENDIX A: AN APPENDIX TITLE THAT IS LONG AND THEREFORE NEEDS MANUAL ADJUSTMENT IN LATEX CODE TO FIT PROPERLY IN TABLE OF CONTENTS

The appendices start here. After references section.

APPENDIX B: SAMPLE PAGES

This booklet (except its title page) is typeset in the format required for the theses.

B.1. Frequently Seen Mistakes

(i) Please read the Format booklet. It will be the most important step to speed up your and other students' processes. Also the Equations document and the Institute Decision About Image Permissions (which is in the Announcements section of the web page) are another must-read documents.

(ii) Thesis title must be all uppercase including the Turkish and English versions, everywhere in the thesis.

(iii) Please double check all page margins, especially in the sections before Introduction.

(iv) Please double check that everything is totally in accordance with the Format booklet, especially in the sections before Introduction.

(v) All surnames must be written with uppercase first letters only.

(vi) There should be no "Dr." but "Ph.D." in the approval page. Correct example is in the "Format.pdf". There should not be any "Dr." with English academic titles.

(vii) In the approval page, there should be a space after the dot of the academic titles.

(viii) In the approval page, jury members' other roles except for "Advisor" and "Co-advisor" should not be mentioned.

(ix) You should pay attention not to use abbreviations "Assist." and "Assoc." in any other version.

(x) Alignment and spacing between elements is very important in the contents page. Text should not be over till the page numbers.

(xi) In the List of Symbols the order must be "Latin–Greek–Others". There should be spacing not between every symbol, but between languages.

(xii) In the List of Abbrev. there should be an alphabetic order with numbers first.

(xiii) In all these lists elements with two lines may cause the spacing to go lower in general. You should give a spacing manually with a spacing command (such as `\vspace`) to standardize the spacing in the page.

(xiv) In the List of Abbrev. first letters of the explanations must be capitalized.

(xv) There should be one line of spacing between every element in the List of Fig-

ures/Tables.

(xvi) The dots on the Contents page must be aligned.

(xvii) All primary level headings must be completely uppercase. There should be two lines of spacing after them. Every other level headings must be first-letter-uppercase.

(xviii) Some extra packages may disrupt the margins, you should always check. Here are the correct margins.

[label=(r)]

(a) For page numbers, top margin 2 cm.

(b) For text, top margin 3.5 cm.

(c) For text, right margin 2 cm.

(d) For text, bottom margin 2 cm.

(e) For text, left margin 3.5 cm.

(xix) There can be a slight and hard to see overflow at the right margin of the Turkish summary. You should check in detail.

(xx) Rules of spacing during the thesis are given below:

- Two lines of spacing after every primary level heading.
- One line of spacing for any other type of heading.
- One line of spacing after paragraphs.
- One line of spacing before figures.
- One line of spacing between figure and its caption (This process is sometimes automatic and sometimes not in the template).
- One line of spacing after the figure's caption (This process is sometimes automatic and sometimes not in the template).
- One line of spacing between table caption. (Don't forget that table captions are on top of the tables.)
- Half a line of spacing after table caption.
- One line of spacing after table itself. (This process is sometimes automatic and sometimes not in the template).

(xxi) No "Fig." or "Sec." kind of abbreviations are allowed. Please check the format booklet for the correct referencing.

(xxii) Please double check the table margins as they tend to slightly overfit the page.

(xxiii) There can be no continuing line left at the bottom of a page. You should pass it to the next page. You can use the `\clearpage` command for this purpose. As it is a stubborn mistake, it is always better to check it again before sending your thesis. Same situation applies for the top of a page. There can't be any "one and only line" continuing from the previous page. You should either finish the paragraph in the previous page or arrange the text so that there will be more than one line of text in the following page.

(xxiv) No bold text is allowed within the text.

(xxv) Even though the page only contains a figure or a table you cannot put it into the middle of the page. Every page should start from the topmost line. No empty lines in the beginning of a page is allowed.

(xxvi) If there is still space at the end of a page, the text should continue. New page can only be started for a primary level heading.

(xxvii) There should be no page numbers in lateral pages. Lateral pages should also be carefully checked for margin breaches as they are more susceptible.

(xxviii) There should be no websites in the text itself. In the references, double check that the website does not cause a margin breach.

(xxix) There should be a dot at the end of every caption.

(xxx) You should not use the term "Algorithm" in the captions, they are figures.

(xxxi) For tables which do not fit into one page, you can continue the table in the following page(s) with using (cont.) in the caption and not changing the table number.

(xxxii) Every equation must be a part of a sentence. Details about equations are given in "Format.pdf". There is even example code for using correct spacing. No extra spacing must be used in equations. Equation template is highly advised.

(xxxiii) Citations to equations must be in parentheses.

(xxxiv) There shouldn't be any paragraphs containing only one line, especially in between the equations.

(xxxv) You should not give the names or numbers of the equations before the equation itself.

(xxxvi) Examples of referencing styles are given in "Format.pdf". The format is neither the same with APA nor IEEE. It is modified from both of them and two types of styles are allowed (Alphabetical or Numerical). Please use with caution.

(xxxvii) Important points about references are given below:

- All your references must be ordered in the order of occurance within the text (discard the list of figures). Also double check to cite every reference.
- No double commas ",," are allowed.
- Page number is an easily forgetable info. You should add the page number information except for books and nearly all. Pay attention not to have any missing info in your references.
- The expressions like ",IEEE," and ",ACM," are not allowed because they are organizations, not publishers.
- No abbreviations are allowed in publishers, names of articles, etc. (For example "Biol. Chap.")
- There should not be more than one year info, even if it is in the name of a conference.
- No et. al. is allowed within the references section. Every author must be written.
- Every word except for conjunctions and prepositions, must have its first letter be uppercase.
- No doi is allowed.
- The website info should not be present if the reference is not a web source itself.
- Please double check the website references from the format.pdf.
- No all uppercase words are allowed except if it is in the title of the reference.
- No month info is allowed except for website references.

(xxxviii) Please use the following rule for quotation marks within LaTeX file:

- Input: Double quote: ``double quote''
- Output: Double quote: "double quote"
- Input: Single quote: `single quote'
- Output: Single quote: 'single quote'

(xxxix) Additional LaTeX packages can be used, however some packages may cause errors and alignment problems in List of Figures/Tables. Examples for a correct and wrong List of Figures are given at the end of the document.

B.2. Equations

B.2.1. Mathematical Expressions

Mathematical expressions such as equations, formulas, etc. should be typeset in accordance with the following rules:

- Mathematical symbols and expressions within the text should be written with the same font used in the equation or equation array environments in order to separate them from the regular text. Italic font is the typical choice.

Good Example 1:. "Notice that the spectral efficiency of the system is $R = n + m = \log_2(NM)$ bits per channel use (bpcu). At each transmission instant, each set of $n + m$ bits is split into groups of n and m bits." (Because the letters N, M, n, and m are used to denote some mathematical entities they are written in the math environment.)

- Mathematical expressions, equations and equation arrays should be part of the text and should not be treated as images or floating objects. This means that
  [label=i)]
  (i) they should be placed with one line spacing between the preceding and following text,
  (ii) if they finish the sentence they should be ended with a full stop (.),
  (iii) if the sentence continues after the mathematical expression it should not have a paragraph indentation or it should not start with a capital letter.

Good Example 2:. The received signal is expressed as

$$y = \mathbf{H}\mathbf{\Psi}\mathbf{x} + \boldsymbol{\nu}, \tag{1.1}$$

where $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

Good Example 3:. The received signal is expressed as

$$y = \mathbf{H}\boldsymbol{\Psi}\mathbf{x} + \boldsymbol{\nu}. \tag{1.2}$$

In this expression, $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

Good Example 4 (Equation Group):. Notice that under the signal model presented in the previous section, z forms a zero-mean proper complex Gaussian random vector with the mean vector, $\mathbf{m}_z$, that can be written as

$$\begin{aligned}\mathbf{m}_z = \mathbb{E}[z] &= \sqrt{\frac{\rho K}{K+1}\left(\bar{h}_u \psi_u X_v - \bar{h}_{\hat{u}} \hat{\psi}_{\hat{u}} X_{\hat{v}}\right)} \\ &= \sqrt{\frac{\rho K}{K+1}\left(\bar{h}_u a_u X_v e^{j\theta_u} - \bar{h}_{\hat{u}} \hat{a}_{\hat{u}} X_{\hat{v}} e^{j\hat{\theta}_{\hat{u}}}\right)},\end{aligned} \tag{1.3}$$

and the covariance matrix, $\boldsymbol{\Sigma}_z$, that can be computed as

$$\boldsymbol{\Sigma}_z = \frac{\rho\, \gamma(u, \hat{u}, v, \hat{v}, \psi_u, \psi_{\hat{u}})\, \boldsymbol{\Sigma}_r}{K+1}, \tag{1.4}$$

where ρ and $\boldsymbol{\Sigma}_r$ are as defined before.

On the other hand, writing of mathematical expressions as in the following are examples of bad practice and is not advised.

Bad Example 1:. (Extra space between the text and the mathematical expressions.)
The received signal is expressed as

$$y = \mathbf{H}\boldsymbol{\Psi}\mathbf{x} + \boldsymbol{\nu}, \tag{1.5}$$

where $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

Bad Example 2:. (Paragraph indent and/or capital letter use after an equation despite the fact that the sentence is continued.)
The received signal is expressed as

$$y = \mathbf{H}\boldsymbol{\Psi}\mathbf{x} + \boldsymbol{\nu} \tag{1.6}$$

Where $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

Bad Example 3:. (Equation appearing as a floating object instead being attached to a sentence.)
The received signal is expressed as follows:

$$y = \mathbf{H}\boldsymbol{\Psi}\mathbf{x} + \boldsymbol{\nu} \tag{1.7}$$

In this expression, $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

- Multiple equations or mathematical expressions should be written in an equation array environment. This guarantees the single line spacing between these expressions. In equation arrays, the individual lines should be aligned such that the

first equality (or inequality or similarity) signs are in line with each other.

Good Example 5:. The SINR for the users in $\hat{U}_1$, the SNR for the users in U_2 on each subcarrier n and the SNR for the remaining users in $\tilde{U}_1$ on each subcarrier k can be written as

$$\Gamma_{\hat{U}_1}^{(n)} = \frac{P_n|h_n|^2}{P_{N+n}|h_{N+n}|^2+\sigma^2} = \frac{P_t|g_n|^2}{\epsilon P_t|g_{N+n}|^2+\sigma^2}, \tag{1.8}$$

$$\Gamma_{U_2}^{(n)} = \frac{P_{N+n}|h_{N+n}|^2}{P_n|a_n-\hat{a}_n|^2|h_n|^2+\sigma^2} = \frac{\epsilon P_t|g_{N+n}|^2}{P_t|a_n-\hat{a}_n|^2|g_n|^2+\sigma^2}, \tag{1.9}$$

$$\Gamma_{\tilde{U}_1}^{(k)} = \frac{P_k|h_k|^2}{\sigma^2} = \frac{P_t|g_k|^2}{\sigma^2}, \tag{1.10}$$

respectively, where $n \in \{1,\ldots,M\}$, $k \in \{M+1,\ldots,N\}$.

Try to avoid writing mathematical expression groups as given in the example below.

Bad Example 4:. The SINR for the users in $\hat{U}_1$, the SNR for the users in U_2 on each subcarrier n and the SNR for the remaining users in $\tilde{U}_1$ on each subcarrier k can be written as

$$\Gamma_{\hat{U}_1}^{(n)} = \frac{P_n|h_n|^2}{P_{N+n}|h_{N+n}|^2+\sigma^2} = \frac{P_t|g_n|^2}{\epsilon P_t|g_{N+n}|^2+\sigma^2} \tag{1.11}$$

$$\Gamma_{U_2}^{(n)} = \frac{P_{N+n}|h_{N+n}|^2}{P_n|a_n-\hat{a}_n|^2|h_n|^2+\sigma^2} = \frac{\epsilon P_t|g_{N+n}|^2}{P_t|a_n-\hat{a}_n|^2|g_n|^2+\sigma^2} \tag{1.12}$$

$$\Gamma_{\tilde{U}_1}^{(k)} = \frac{P_k|h_k|^2}{\sigma^2} = \frac{P_t|g_k|^2}{\sigma^2} \tag{1.13}$$

respectively, where $n \in \{1,\ldots,M\}$, $k \in \{M+1,\ldots,N\}$.

- Mathematical expressions should be referred to after they appear first and not before. Try to avoid from forward referencing.

Bad Example 5:. The received signal is expressed as in Equation (1.14) given below:

$$y = \mathbf{H}\mathbf{\Psi}\mathbf{x} + \boldsymbol{\nu}. \tag{1.14}$$

$\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

Bad Example 6:. The received signal is expressed as

$$y = \mathbf{H}\mathbf{\Psi}\mathbf{x} + \boldsymbol{\nu}. \tag{1.15}$$

In Equation (1.15), $\mathbf{H}$ is the $N_r \times N_t$ dimensional channel matrix and $\mathbf{y}$ and $\boldsymbol{\nu}$ are the $N_r \times 1$ dimensional received signal and channel noise vectors, respectively.

This equation template should be followed strictly.