

ISTANBUL TICARET UNIVERSITY
FACULTY OF ENGINEERING

ENG402 GRADUATION PROJECT

GRADUATION PROJECT REPORT

Department :

Year/Term :

Student's

Name-Surname :

ID :

Title of the Project :

Advisor :

Date :

Signature:

DECLARATION

All the data in the graduation study are obtained by me within the framework of academic rules, all visual and written information and results are presented in accordance with academic and ethical rules, there is no falsification in the data used, in case of benefiting from the works of others, it is referred to in accordance with scientific norms, I declare that it has not been used in any thesis work at the university or another university.

Signature :

Name and Surname :

…… / …… / 2023

<If the number of people who prepared the report is more than one, the name/ surname and signature entries of all people should be stated above. This comment section should be deleted.>

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ABSTRACT

<In this section give one paragraph brief and concise information about your project including the following information:

i. Aim of the project,

ii. A brief introduction of the subject, why this subject was chosen,

iii. The theoretical approach and the outline of the method to be used,

iv. The objectives to be achieved and what kind of scientific, technological and socio-economic contributions it can make.>

Keywords: <Make sure that keywords should be chosen in accordance with the international literature>

ÖZET

< Bu bölümde, aşağıdaki bilgiler dahil olmak üzere projeniz hakkında bir paragraflık kısa ve öz bilgi verin:

i. Projenin amacı,

ii. Konunun kısa bir tanıtımı, neden bu konunun seçildiği,

iii. Teorik yaklaşım ve kullanılacak yöntemin ana hatları,

iv. Ulaşılacak hedefler ve ne tür bilimsel, teknolojik ve sosyo-ekonomik katkılar yapabileceği.>

Anahtar Kelimeler: <Anahtar kelimeleri, uluslararası literatüre uygun seçiniz>

ACKNOWLEDGEMENTS

<The author of the report expresses gratitude to individuals, organizations, or institutions who have contributed to the creation or completion of the work. The purpose of the acknowledgement section is to recognize and thank those who have helped or supported the author in some way, such as providing guidance, funding, resources, or encouragement. It can also be a way for the author to show appreciation for friends, family, or colleagues who have offered personal or emotional support during the writing process.>

LIST OF SYMBOLS AND ABBREVIATIONS

EMO : Turkish Chamber of Electrical Engineers

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<The list of symbols and abbreviations has been prepared in the form of a table. If there are not enough rows, you can add rows, or if there are too many rows, you can delete those rows. It should be noted that symbols and abbreviations are made in alphabetical order. This comment section should be deleted.>

LIST OF FIGURES

Figure 1 Block Diagram of a Unit Feedback Control System 1

<The list of figures has been formed automatically. You may automatically update it if you use automatic numbering in the text. Do not make any changes to the format. This comment section should be deleted.>

LIST OF TABLES

Table 1 Standards Bodies 2

<The list of tables has been formed automatically. You may automatically update it if you use automatic numbering in the text. Do not make any changes to the format. This comment section should be deleted.>

1. INTRODUCTION

<This section serves as an introduction for the topic at hand and is expected to provide brief information about the project, its extent and the aim of the work; the objectives of the project and the justification of these objectives should be briefly but clearly explained. Finally, the summary of the information given in the remaining sections should also be presented. The Introduction section is usually *not* divided into subsections. The following sections may have subsections.>

2. PROJECT DESCRIPTION

<This section provides a thorough and detailed description of the design project, as well as the motivation for the work and possible utilization schemes for the intended outcome in practice. The steps that are considered to be taken throughout the design and implementation of the project need to be clearly presented in this section. Visual elements such as schematic depictions, illustrations, block diagrams and photographs of the intended design steps and those of similar or related previous designs should be utilized in order to provide the reader with a better understanding of the overall project. These should be first mentioned in the text and then appear later in the report, as shown in Figure 1.

At this point, it is important to emphasize that your design experience should be based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints.>

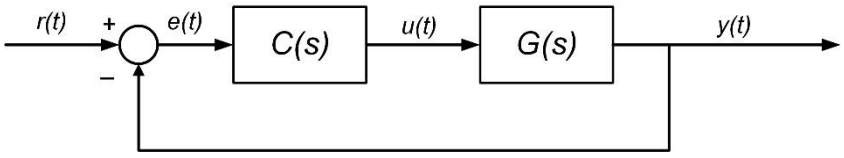


FIGURE 1 BLOCK DIAGRAM OF A UNIT FEEDBACK CONTROL SYSTEM

3. ENGINEERING STANDARDS AND DESIGN CONSTRAINTS

<The design should be subject to engineering standards and/or multiple realistic constraints. There should be at least one standard and one constraint mentioned in this report. These chosen standards and constraints must be followed and applied throughout the rest of the project, so it is important that they be identified accordingly at this point.>

3.1. ENGINEERING STANDARDS

<This section of the report aims to clarify which engineering standards that apply to this design project and how the design project is expected to satisfy these standards.

Include the necessary standards and indicate their possible relevance to your project. As an example, if you are using IEEE 802.11 standard in your design you are expected to go through that standard and include in your Interim Report how you will utilize this standard in your design. An example list of engineering standards is given in Table 1.

TABLE 1 STANDARDS BODİES

Standard Body	**Website Link**
European Standards	https://www.en-standard.eu
ANSI American National Standards Institute	http://webstore.ansi.org/
IEEE standards	http://standards.ieee.org/
ISO	http://webstore.ansi.org/
UL safety	http://www.ul.com/
ASTM Standards	https://www.astm.org/Standard/
NIST Standards	https://www.nist.gov/
TSE Turkish Standards Institute	https://intweb.tse.org.tr/Standard/Standard/StandardAra.aspx

3.2. DESIGN CONSTRAINTS

<The design constraints should be identified and some discussion on how these apply to the design project and their realization are to be included in this section. You may refer to the list of some realistic design constraints that are listed below:

- Economy:
  - Budget limitations
  - Cost of similar or related products, if any, on the market.
  - Maintenance cost
- Environment:
  - Power consumption
  - Electromagnetic radiation issues

    - Environment friendly power sources
    - Noise pollution
- Society:
    - Assisted living for the disabled and elderly
    - Information security, privacy
    - Social networking and communication
- Politics:
    - Designs that promote gender and race equality
    - Products that help national security
    - Designs that help solve common international and national problems
- Ethics:
    - Designs that do not violate safety and health issues.
    - Designs that respect patents and intellectual rights.
    - Privacy issues.
    - Honesty, truthfulness, and openness in the design and the report.
- Health and Safety:
    - Public safety
    - Safety of the consumers of the product.
    - Safety of workers.
- Manufacturability:
    - Designs that suit to current manufacturing technology.
    - Designs that can be physically implemented.
- Sustainability:
    - Reliability and durability of the design (water-proof, dust-proof, etc.)
    - Designs that support future upgrades
    - Designs that are resilient to a range of environmental conditions.

Other constraints can be identified and discussed, if applicable.>

4. BACKGROUND

<The design will require a background on electrical and electronics engineering topics. This section should provide the background in the related areas that will be necessary to do the design project. The background that the students have based on their earlier coursework, and the background obtained as a result of further study by the students should be presented separately.>

4.1. BACKGROUND ACQUIRED IN EARLIER COURSE WORK

<In this subsection, present the theoretical background obtained in courses taken in the first three years of the undergraduate program that will be used in the project. Provide the discussion of these topics such as available methods and tools, if necessary

mathematical formulae and derivations. For example, the output of the system in Figure 1, i.e. $y(t)$ is given as in Eq. 1:

$$y(t) = \frac{C(s)G(s)}{1 + C(s)G(s)} r(t) \quad (1)$$

For each topic, state the related course name and number. >

4.2. BACKGROUND ACQUIRED THROUGH ADDITIONAL RESEARCH

<Typically, the theoretical background acquired in earlier course work is not sufficient to carry out the project work. Additional research is needed to complete each project such as literature review, advanced theoretical or practical studies, background in the specific field, software or hardware know-how, etc. Present any background knowledge that is required for the project but not acquired in earlier course work in this subsection.>

5. METHODS

<To achieve the goal of the project, there may be more than one approaches or methods.

In this section,

- Describe each of the methods or the approaches.
- Present a discussion of the type of goal and methods
- Describe each method in a subsection in detail.
- Present the advantages and disadvantages of each method.
- Give citations when you use references for each method.>

5.1. METHOD 1 (YOU MAY REPLACE WITH THE NAME OF THE METHOD)

<Explain the first method in detail. Explain advantages and disadvantages. Use references. Use figures when necessary.>

5.2. METHOD 2 (YOU MAY REPLACE WITH THE NAME OF THE METHOD)

<Explain the second method in detail. Explain advantages and disadvantages. Use references. Use figures when necessary.>

6. PRELIMINARY DESIGN

<Based on the methods provided in the previous section,

- Choose one of the methods, and explain the reasoning behind your choice.

- Provide a preliminary design using the chosen method. Use figures, flow charts, etc. in order to describe the preliminary design.

Clearly identify the parameters and design choices in the preliminary design. At this stage, you do not need to determine the value of the parameters. You do not need to make design choices. However, you do need to identify what the parameters and design choices are.>

7. PROTOTYPE

<In this section, introduce and describe the hardware/software prototype. Clearly indicate:

- the purpose for building the prototype,
- what the prototype does,
- an overview of its key features.

If appropriate, include a photograph, flowchart or another visual source for the prototype.>

8. DESIGN PROCESS

<In this section, present the steps of the design process performed in constructing the prototype. The engineering design process is a series of steps that engineers follow to solve a design problem, and often involves an iterative process. Iteration is, in general, defined as the act of repeating something over and over again to improve the process and eventually achieve a desired goal. In a typical design loop:

1) a solution is generated,
2) the solution is implemented, and
3) the result of the implementation is tested and evaluated.

If the results do not satisfy the requirements, additional solutions are generated and the above three-step process starts over again. This cycle and iteration continue until satisfactory results are obtained and the desired goal is achieved.

In the following subsections, discuss how the design is modified in each iteration by providing and evaluating the results obtained during testing, including difficulties encountered and new solutions proposed.>

8.1. ITERATION 1 <YOU MAY REPLACE WITH THE NAME OF THE PROCESS>

<Explain the first iteration in your prototype design.>

8.1.1. TESTING AND RESULTS

<Describe how the requirements were tested, provide results that show what you obtained, and interpret the results, including whether the requirements were satisfactorily satisfied.>

8.1.2. EVALUATION

<Honestly assess the strengths and weaknesses of your design, and develop new solutions if certain requirements are not met. Clearly discuss what modifications and solutions are needed to improve the design. >

8.2.ITERATION 2 <YOU MAY REPLACE WITH THE NAME OF THE PROCESS>

<If the design is not validated in the first iteration, explain the second iteration in this section. Clearly explain what modifications were performed to improve the design.>

8.2.1. TESTING AND RESULTS

<Describe how the requirements were tested, provide results that show what you obtained, and interpret the results, including whether the requirements were satisfactorily satisfied.>

8.2.2. EVALUATION

<Honestly assess the strengths and weaknesses of your design, and develop new solutions if certain requirements are not met. Clearly discuss what modifications and solutions are needed to improve the design.

(Include new subsections 3.3, 3.4, etc., if additional iterations were performed to reach the prototype design. Discuss the strengths and weaknesses of your prototype design in the last iteration, and suggest new solutions to be performed in the final design.)>

9. FINAL DESIGN

<Describe the final design in detail.

- Indicate the methods used in the final design, and explain the reasoning behind your choice. Use figures, flow charts, etc. in order to describe the final design.
- Clearly identify the parameters and design choices in the final design.
- Provide the results of testing for the final design.
- Assess the strengths and weaknesses of your final design, and discuss whether the requirements are met in the final design.>

9.1. MEETING THE CONSTRAINTS AND ENGINEERING STANDARDS

<Discuss how the final design satisfies the engineering standards and multiple constraints identified previously.>

9.2. COST ANALYSIS

<Itemize the cost of each component of the final product, and discuss the cost effectiveness of the project.>

10. TEAM WORK

<In this section, information is given about the division of labor among the team members, the changes in this distribution of work during the term, the contribution of each team member to the project and how efficient the teamwork is.>

11. CONCLUSION

<The inclusion of the conclusion section is mandatory in the term report. It should start with a brief summary of the report. and present an elaborate picture of the final status of the graduation project. The author is expected to briefly discuss the obtained results in terms of goals set for the project, accuracy, sufficiency, etc. Finally, the steps of the proposed future studies need to be indicated.>

REFERENCES

<When a reference, such as a book [1-2], handbook [3], report [4], journal [5], or conference paper [6], or any other document is cited in the text, it should be properly listed in the References section. Use the IEEE Citation Reference format.>

[1] J. K. Author, "Title of chapter in the book," in *Title of His Published Book, x*th ed. City of Publisher, Country if not USA: Abbrev. of Publisher, year, ch. *x*, sec. *x*, pp. *xx–xx.*

[2] B. Klaus and P. Horn, *Robot Vision.* Cambridge, MA: MIT Press, 1986.

[3] *Motorola Semiconductor Data Manual*, Motorola Semiconductor Products Inc., Phoenix, AZ, 1989.

[4] J. H. Davis and J. R. Cogdell, "Calibration program for the 16-foot antenna," Elect. Eng. Res. Lab., Univ. Texas, Austin, Tech. Memo. NGL-006-69-3, Nov. 15, 1987.

[5] R. E. Kalman, "New results in linear filtering and prediction theory," *J. Basic Eng.*, ser. D, vol. 83, pp. 95-108, Mar. 1961.

[6] C. Berrou, A. Glavieux, and P. Thitimajshima, "Near Shannon limit error-correcting coding and decoding: Turbo-codes. 1," in *Proc. Int. Conf. Commun.*, Geneva, Switzerland, May 1993, pp. 1064–1070.

APPENDIX A

< The final version of the project management plan, which was prepared at the beginning of the ENG401 course and updated throughout the project, will be given in this section.>