HCMC UNIVERSITY OF TECHNOLOGY
Faculty of Transportation Engineering
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A BRIEF PROPOSAL OF THESIS /CAPSTONE PROJECT

Semester __222____

1. Thesis/Project title: Modelling, simulation, and control of assisting motor and control rules of Electric Powered Steering (EPS) system.

2. Advisor's full name: PhD. Ngô Đắc Việt

PhD. Trần Đăng Long

3. Student's full name: Đặng Minh Duy **- ID:** 1910933

4. Thesis content:

4.1. Type:
- ☐ A product design
- ☐ A technical evaluation
- ☐ A scientific research
- ☒ Other:A product analysis and design

4.2. Objectives & Technical requirements:

- Electric motor modelling and control
- EPS system analysis and design of control rule for motor assisting according to different vehicle speeds and steering wheel's angles.
- Technical requirements
  - Simulation model works properly
  - Accurate assisting moment
  - Assisting moment from motor can follow as desired
  - Accurate control algorithm

4.3. Core problems to be solved & Solving ideas/methods:

- Calculate and determine assisting torque of the electric motor in different vehicle speeds and steering angles
- Solving ideas/methods: Based on input of resisting torque from kinematic and dynamic model of EPS's mechanical system, steering wheel's angle, vehicle speed, determine, calculate, and simulate the control rules and verify in MATLAB/Simulink

4.4. Works to be done & Required results:

No.	**Works to be done**	**Required results** *(Ex: data, equations, models, diagrams, parameters, charts, findings…)*
1	Research on theory of automatic control system	Finding
2	Simulation of motor model and control	Model

No.	Works to be done	**Required results** *(Ex: data, equations, models, diagrams, parameters, charts, findings…)*
	motor's moment in MATLAB/Simulink	
3	Calculate and determine control rules of assisting motor	Data, Parameter, Finding
4	Simulation of control rule combing with mechanical model of steering system	Model, Charts

4.6. Requested products:

☒ Technical report ☒ Poster ☐ Scientific paper

☐ Software ☐ Firmware ☒ Simulation model

☐ General layout drawings ☐ Detailed drawings ☐ Assembly drawings

☐ Others:

4.7. Scope of Thesis/Project:

- This capstone project focuses on the design of control rules of assisting motor of EPS system, does not focus on analysis of electrical components of the system

4.8. Tasks of each team member:

No.	Member's full name	Works assigned
1	Đặng Minh Duy	Simulation of control of assisting motor and control rules of EPS according to the operating conditions of vehicle speed and steering wheel's angles

5. Technical strengths of team members and practical opportunities:

- Skill on summarizing theory
- Background knowledge of EPS system through the internship and the previous capstone project.

6. Technical weaknesses of team members and practical threats:

No.	Technical weakness/ Practical threats	Degree of risk of Thesis/Project failure *(Low/Medium/High)*	Solutions to overcome
1	Lack of solidwork skill	Medium	Learn how to use program immediately
2	Lack of MATLAB/Simulink skills	Medium	Watch the youtube tutorials and practice day by day
3	Not studying enough theoretical basis for the controller design.	Medium	Concentrate on studying for the first weeks.

8. Working plan for 15+1 weeks: *(including: tasks to be done; solutions to overcome weakness and threats; mid-term report (X); ...)*

No.	Works	Week														
		1	2	3	4	5	6	7	8	9	X	11	12	13	14	15	16
1	**Introduction of project**	x															
2	**Study on theory of automatic control system**		x	x													
3	**Build assisting motor model and control of motor's moment in MATLAB/Simulink**				x	x	x	x									
4	**Calculate and determine control rule of EPS system**								x	x		x					
5	**Build simulation model of control rules of EPS in MATLAB/Simulink**											x	x	x	x		
6	Make poster												x				x
7	Make presentation slides																x
8	Write full report																x

Student: Đặng Minh Duy **-ID:** 1910933 - **Signature:** Duy

Date (dd/mm/yyyy): 15/05/2023

ADVISOR