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

Semester __222____

1. **1. Thesis/Project title:** Modeling and simulation the resistance torque for specific wheel alignment in the Electric Power Steering system by using Matlab/Simulink and its application.

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

PhD. Trần Đăng Long

3. Student's full name: Hồ Bình Minh **- ID: 1852169**

4. Thesis content:

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

4.2. Objectives & Technical requirements:

_ Find out how wheel alignment can affect the resistance torque in the steering mechanism especially in the EPS system.

_ Fully understanding knowledge about the resistance torque between the tire force and road surface in steering mechanism especially in the EPS system.

_ Build the complete model of the resistance torque between the tire forces and road by using Matlab/Simulink.

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

_ Research and calculate the equation of the resistance torque between tire and road for longitudinal force, lateral force and normal force and model it in Matlab/Simulink => Read the book and scientific paper to get the full equations. Besides, study the Matlab/Simulink tutorials to get more knowledge about modeling 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	The resistance torque model for the drive wheel system acting on the Electric Power Steering system.	Equations
2	Simulation the resistance torque model in Matlab/Simulink	Model

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:

The model is developed to focus on the analysis modeling and simulation all relevant resistance torque of the drive wheel system which will affect to dynamic behavior of the EPS system.

4.8. Tasks of each team member:

No.	Member's full name	Works assigned
1	Hồ Bình Minh	Summarize the resistance torque theory between tire and road and model them into MATLAB. Analyze its effects by changing the specific factors such as: vehicle mass, wheel alignment, steering angle,..

5. Technical strengths of team members and practical opportunities:

_ Good knowledge about vehicle dynamics theory.

_ Active concentration on finding out the complete model for the resistance torque model.

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
	Lack of reference models	Medium	Find more specific researches and books

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	**Synthetic theory**		x	x													
3	**Choose plan and prepare technical paper for reference**				x	x	x										
4	**Build the resistance torque equation between tire forces and road model**							x	x	x							
5	**Build Matlab/Simulink model**								x	x		x	x				
6	**Build Matlab/Simulink model**													x	x	x	
7	**Make poster**												x				x
8	**Make presentation slides**																x
9	**Write full report**																x

Student: Hồ Bình Minh **-ID: 1852169** **- Signature:** Minh

Date (dd/mm/yyyy): 22/05/2023

ADVISOR