

MEA313 Automotive Theory



Major Task 2 LAB 3

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Car Used: 1969 Ford Mustang Sportsrooftop 200 SIX

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1.0 INTRODUCTION

This laboratory aims to determine the vehicle's front and rear braking coefficients (K_{bf} , K_{br}), which represent the distribution of braking force between the front and rear wheels. The front and rear braking coefficients indicate the amount of force applied to the front and rear wheels, respectively. Achieving the correct balance between these coefficients is crucial for effective braking, reducing skidding, and maintaining stability during braking maneuvers.

2.0 CODE

```
clc
clearvars

syms Kbf Kbr
% wheelbase
l1 = 1.454;
l2 = 1.289;
mu = 0.9; % coff of friction
h = 0.781; % height of CG
fr = 0.015; % rolling coefficient

eq1 = Kbf / Kbr == (l2 + h * (mu + fr)) / (l1 - h * (mu + fr));
eq2 = Kbf + Kbr == 1;
sol = vpasolve([eq1, eq2], [Kbf, Kbr]);
```

Initially, the necessary parameters [1] mentioned previously are gathered to compute K_{bf} and K_{br} . Next, the equations for obtaining the coefficients are stored in variables $eq1$ and $eq2$, which are solved simultaneously with the help of the $vpasolve$ function. Finally, the K_{bf} and K_{br} solutions are saved in the sol array and displayed using $fprintf$.



2.1 Kbf & Kbr Values

```
Variables - sol.Kbr
sol.Kbr
sol.Kbr

val =
0.2696

Variables - sol.Kbf
sol.Kbf
sol.Kbf

val =
0.7304
```

2.2 Workspace

Name	Value	Size	Bytes	Class
eq1	1x1 sym	1x1	8	sym
eq2	1x1 sym	1x1	8	sym
fr	0.0150	1x1	8	double
h	0.7810	1x1	8	double
Kbf	1x1 sym	1x1	8	sym
Kbr	1x1 sym	1x1	8	sym
I1	1.4540	1x1	8	double
I2	1.2890	1x1	8	double
mu	0.9000	1x1	8	double
sol	1x1 struct	1x1	352	struct



REFERENCE

- [1] Ford Mustang Sportsroof 200 Six (man. 3) (1969): https://www.automobile-catalog.com/make/ford_usa/mustang_1gen/mustang_1gen_base_fastback/1969.html#gsc.tab_0

Drive link for the m file:

https://drive.google.com/file/d/1zleQpaSiHtIedeRAc65l4FsITkI9OJiQ/view?usp=drive_link