CruiseAuto Project – Milestone 4

**ANSWER SHEET:** Algorithm Refinement and Final Deliverables

Table of Contents

[CruiseAuto Project – Milestone 4 1](#_Toc179973512)

[Part 1. Assignment Header 3](#_Toc179973513)

[Part 2. Milestone 3 Feedback and Reflection 3](#_Toc179973514)

[Part 3. Algorithm Improvement Plan 3](#_Toc179973515)

[Improvement #1 3](#_Toc179973516)

[Improvement #2 3](#_Toc179973517)

[Part 4. Algorithm Refinements Implementation and Results 4](#_Toc179973518)

[4a. Refinement Results with Benchmark Data 4](#_Toc179973519)

[Table 4a.1 - Results for Sedan Benchmark Data 4](#_Toc179973520)

[Table 4a.2 - Results for Sedan Benchmark Data 4](#_Toc179973521)

[Table 4a.3 - Results for SUV Benchmark Data 4](#_Toc179973522)

[Table 4a.4 – Results for SSEmod 4](#_Toc179973523)

[4b. Refinement Results with Experimental Data 5](#_Toc179973524)

[Table 4b.1 – M3 and M4 Algorithm Comparison of Experimental Data Parameters 5](#_Toc179973525)

[4c. Performance Check with Experimental Parameters 5](#_Toc179973526)

[Table 4c.1 – Performance Boundary Results 5](#_Toc179973527)

[Part 5. Algorithm Performance Discussion 6](#_Toc179973528)

[Part 6. Technical Brief 6](#_Toc179973529)

[Part 7. Resumé Insert 6](#_Toc179973530)

[Part 8. References 6](#_Toc179973531)

[Part 9. MATLAB Built-in Functions 7](#_Toc179973532)

# Part 1. Assignment Header

**Section and Team ID:** <replace this text with your SSS\_TT ID>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Team Member Name** | **Purdue Career Account Login** | **Programmer Number** | **Detailed Description of the Work** | **Percent of Work** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

# Part 2. Milestone 3 Feedback and Reflection

Strength: <answer here>

Limitation: <answer here>

How could the feedback from M3 lead to improvements? <answer here>

What concrete steps will you take to incorporate the M3 feedback to improve your algorithm?

<answer here>

# Part 3. Algorithm Improvement Plan

## Improvement #1

Parameter(s) Targeted: <answer here>

Describe the improvement that your team is introducing to the M3 algorithm: <answer here>

Why are these refinements necessary and how will they improve your algorithm?: <answer here>

## Improvement #2

Parameter(s) Targeted: <answer here>

Describe the improvement that your team is introducing to the M3 algorithm: <answer here>

Why are these refinements necessary and how will they improve your algorithm?: <answer here>

# Part 4. Algorithm Refinements Implementation and Results

## 4a. Refinement Results with Benchmark Data

### Table 4a.1 - Results for Compact Hatchback Benchmark Data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Benchmark Values** | **M3 Algorithm Values** | **M3 Percent Error** | **M4 Algorithm Values** | **M4 Percent Error** |
| Acceleration start time [s] |  |  |  |  |  |
| Time constant [s] |  |  |  |  |  |
| Initial speed [m/s] |  |  |  |  |  |
| Final speed [m/s] |  |  |  |  |  |

### Table 4a.2 - Results for Midsize Sedan Benchmark Data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Benchmark Values** | **M3 Algorithm Values** | **M3 Percent Error** | **M4 Algorithm Values** | **M4 Percent Error** |
| Acceleration start time [s] |  |  |  |  |  |
| Time constant [s] |  |  |  |  |  |
| Initial speed [m/s] |  |  |  |  |  |
| Final speed [m/s] |  |  |  |  |  |

### Table 4a.3 - Results for SUV Benchmark Data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Benchmark Values** | **M3 Algorithm Values** | **M3 Percent Error** | **M4 Algorithm Values** | **M4 Percent Error** |
| Acceleration start time [s] |  |  |  |  |  |
| Time constant [s] |  |  |  |  |  |
| Initial speed [m/s] |  |  |  |  |  |
| Final speed [m/s] |  |  |  |  |  |

### Table 4a.4 – Results for SSEmod

|  |  |  |  |
| --- | --- | --- | --- |
| **Vehicle** | **from Benchmark Parameters (Part 4a of M3)** | **from M3 Algorithm Parameters (Part 4b of M3)** | **from M4 Algorithm Parameters** |
| Compact Hatchback |  |  |  |
| Midsize Sedan |  |  |  |
| Large SUV |  |  |  |

## 4b. Refinement Results with Experimental Data

### Table 4b.1 – M3 and M4 Algorithm Comparison of Experimental Data Parameters

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Vehicle** | **Tire Type** | **M3 Algorithm Parameters** | | | | **M4 Algorithm Parameters** | | | |
| **Start time [s]** | **Time constant [s]** | **Initial speed [m/s]** | **Final speed [m/s]** | **Start time [s]** | **Time constant [s]** | **Initial speed [m/s]** | **Final speed [m/s]** |
| Compact Hatchback | Summer |  |  |  |  |  |  |  |  |
| Compact Hatchback | All-Season |  |  |  |  |  |  |  |  |
| Compact Hatchback | Winter |  |  |  |  |  |  |  |  |
| Midsize Sedan | Summer |  |  |  |  |  |  |  |  |
| Midsize Sedan | All-Season |  |  |  |  |  |  |  |  |
| Midsize Sedan | Winter |  |  |  |  |  |  |  |  |
| Large SUV | Summer |  |  |  |  |  |  |  |  |
| Large SUV | All-Season |  |  |  |  |  |  |  |  |
| Large SUV | Winter |  |  |  |  |  |  |  |  |

## 4c. Performance Check with Experimental Parameters

### Table 4c.1 – Performance Boundary Results

|  |  |  |
| --- | --- | --- |
| **Vehicle** | **Tire Type** | **Within Bounds or Outside Bounds?** |
| Compact Hatchback | Summer |  |
| Compact Hatchback | All-Season |  |
| Compact Hatchback | Winter |  |
| Midsize Sedan | Summer |  |
| Midsize Sedan | All-Season |  |
| Midsize Sedan | Winter |  |
| Large SUV | Summer |  |
| Large SUV | All-Season |  |
| Large SUV | Winter |  |

# Part 5. Algorithm Performance Discussion

Do you believe your algorithm accurately reflects the true performance of the system? Why or why not?

<answer here>

Does your algorithm need more work that you are unable to complete because of the due date? If yes, describe what you would do. If no, justify why your analysis is complete as-is.

<answer here>

Does your technical brief reflect your critique of your algorithm’s performance? Remember, it is vital in engineering to accurately represent your work.

<answer here>

# Part 6. Technical Brief

Use the template document provided. Upload all deliverables to Gradescope.

# Part 7. Resumé Insert

**HEADER**

**Project** **Title**, *Purdue University* Semester YYYY

* Power Verb (Skill) + Identifiable task + Purpose/Method/or Result
* Power Verb (Skill) + Identifiable task + Purpose/Method/or Result
* Power Verb (Skill) + Identifiable task + Purpose/Method/or Result

# Part 8. References

<list references for any external sources used here>

# Part 9. MATLAB Built-in Functions

Fill out the following information **for each** MATLAB built-in function that your algorithm uses that was not explicitly taught in class. Add additional rows as needed. If you did not use any new built-in MATLAB functions, then delete the table below and write “No new function used.”

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name & Call (include inputs/outputs)** | **Where in your algorithm do you use the function?** | **Describe the inputs needed to run the function.** | **Describe the outputs from the function.** | **Describe the theory and/or mathematics behind how the function operates.** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |