Model Comparison - Test Specification Report

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Table of Contents

1. Comparison Tests

Test Details

Releases	Current (2019b)
Description	This report aims to check congruences and differences between two vehicle models: Dynamic model and Kinematic model. In all the comparisons, our Dynamic model is considered as the baseline. For the tests purposes we have not included Equivalence Criteria, indeed this will be a qualitative analysis. The only parameter we have set up is the relative tolerance, assigning to it a value of 1% in order to ignore the negligible offsets between the Dynamic and the Kinematic model.

External Inputs for Simulation 1

Name	File Path	Status
Free_evolution.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Free_evolution.mat	Successfully mapped inputs.
Only_throttle.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Only_throttle.mat	Successfully mapped inputs.
Constant_steering.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Constant_steering.mat	Successfully mapped inputs.
Ramp_steering.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Ramp_steering.mat	Successfully mapped inputs.

Name	File Path	Status
Small_sinusoidal-_steering.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Small_sinusoidal_steering.mat	Successfully mapped inputs.
Big_sinusoidal_steering.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Big_sinusoidal_steering.mat	Successfully mapped inputs.
Combined1.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Combined1.mat	Successfully mapped inputs.
Combined2.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Combined2.mat	Successfully mapped inputs.

External Inputs for Simulation 2

Name	File Path	Status
Free_evolution.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Free_evolution.mat	Successfully mapped inputs.
Only_throttle.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Only_throttle.mat	Successfully mapped inputs.
Constant_steering.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Constant_steering.mat	Successfully mapped inputs.
Ramp_steering.-mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Ramp_steering.mat	Successfully mapped inputs.
Small_sinusoidal-_steering.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Small_sinusoidal_steering.mat	Successfully mapped inputs.

Name	File Path	Status
Big_sinusoidal_steering.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Big_sinusoidal_steering.mat	Successfully mapped inputs.
Combined1.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Combined1.mat	Successfully mapped inputs.
Combined2.mat	D:\Documenti\GitHub\dynamic-obstacle-avoidance\Code\Files\Model Comparison Tests\Combined2.mat	Successfully mapped inputs.

Iterations

<table>
<tr><th>Name</th><th>Description</th><th>Details</th></tr>
<tr><td>Free evolution</td><td>Free Evolution

Test performed starting from an initial condition with input equal to 0</td><td>
<table>
<tr><th>Parameter Name</th><th>Value</th><th>Simulation Index</th></tr>
<tr><td>External Inputs</td><td>Free_evolution.mat</td><td>1</td></tr>
<tr><td>Parameter Set</td><td>Free_evolution.mat</td><td>2</td></tr>
<tr><td>Logged Signal Set</td><td>Signal Set 1</td><td>2</td></tr>
</table>
</td></tr>
<tr><td>Only throttle</td><td>Only throttle

Test performed keeping the steering angle equal to 0 and va-</td><td>
<table>
<tr><th>Parameter Name</th><th>Value</th><th>Simulation Index</th></tr>
<tr><td>External Inputs</td><td>Only_throttle.mat</td><td>1</td></tr>
<tr><td>Parameter Set</td><td>Only_throttle.mat</td><td>2</td></tr>
</table>
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<table>
<tr><th>Name</th><th>Description</th><th>Details</th></tr>
<tr><td></td><td>rying the throttle</td><td><table><tr><th>Parameter Name</th><th>Value</th><th>Simulation Index</th></tr><tr><td>Logged Signal Set</td><td>Signal Set 1</td><td>2</td></tr></table></td></tr>
<tr><td>Constant steering</td><td>Constant steering

Test performed keeping the throttle equal to 0 and giving a constant steering angle value</td><td><table><tr><th>Parameter Name</th><th>Value</th><th>Simulation Index</th></tr><tr><td>External Inputs</td><td>Constant_steering.mat</td><td>1</td></tr><tr><td>Parameter Set</td><td>Constant_steering.mat</td><td>2</td></tr><tr><td>Logged Signal Set</td><td>Signal Set 1</td><td>2</td></tr></table></td></tr>
<tr><td>Ramp steering</td><td>Ramp steering

Test performed keeping the throttle equal to 0 and giving a ramp steering angle signal (from 0° to 36°)</td><td><table><tr><th>Parameter Name</th><th>Value</th><th>Simulation Index</th></tr><tr><td>External Inputs</td><td>Ramp_steering.mat</td><td>1</td></tr><tr><td>Parameter Set</td><td>Ramp_steering.mat</td><td>2</td></tr><tr><td>Logged Signal Set</td><td>Signal Set 1</td><td>2</td></tr></table></td></tr>
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<table>
<tr><th>Name</th><th>Description</th><th>Details</th></tr>
<tr><td>Small sinusoidal steering</td><td>Small sinusoidal steering Test performed keeping the throttle equal to 0 and giving a sinusoidal steering angle signal with frequency 0.2-Hz and amplitude 5°</td><td>
<table>
<tr><th>Parameter Name</th><th>Value</th><th>Simulation Index</th></tr>
<tr><td>External Inputs</td><td>Small_sinusoidal_steering.mat</td><td>1</td></tr>
<tr><td>Parameter Set</td><td>Small_sinusoidal_steering.mat</td><td>2</td></tr>
<tr><td>Logged Signal Set</td><td>Signal Set 1</td><td>2</td></tr>
</table>
</td></tr>
<tr><td>Big sinusoidal steering</td><td>Big sinusoidal steering Test performed keeping the throttle equal to 0 and giving a sinusoidal steering angle signal with frequency 0.2-Hz and amplitude 15°</td><td>
<table>
<tr><th>Parameter Name</th><th>Value</th><th>Simulation Index</th></tr>
<tr><td>External Inputs</td><td>Big_sinusoidal_steering.mat</td><td>1</td></tr>
<tr><td>Parameter Set</td><td>Big_sinusoidal_steering.mat</td><td>2</td></tr>
<tr><td>Logged Signal Set</td><td>Signal Set 1</td><td>2</td></tr>
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<table>
<tr><th>Name</th><th>Description</th><th>Details</th></tr>
<tr><td>Combined 1</td><td>Combined 1

Throttle signal with a predefined shape and constant steering angle</td><td>
<table>
<tr><th>Parameter Name</th><th>Value</th><th>Simulation Index</th></tr>
<tr><td>External Inputs</td><td>Combined1.mat</td><td>1</td></tr>
<tr><td>Parameter Set</td><td>Combined1.mat</td><td>2</td></tr>
<tr><td>Logged Signal Set</td><td>Signal Set 1</td><td>2</td></tr>
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<tr><td>Combined 2</td><td>Combined 2

Ramp steering angle signal with a constant throttle</td><td>
<table>
<tr><th>Parameter Name</th><th>Value</th><th>Simulation Index</th></tr>
<tr><td>External Inputs</td><td>Combined2.mat</td><td>1</td></tr>
<tr><td>Parameter Set</td><td>Combined2.mat</td><td>2</td></tr>
<tr><td>Logged Signal Set</td><td>Signal Set 1</td><td>2</td></tr>
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