Controller Test: Specification Report

Team 2 (CoDeAS 20/21)

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1. controllerTest

Test File Options

Close open figures	true
Store MATLAB figures	false
Generate report	false

1.1. No Charge

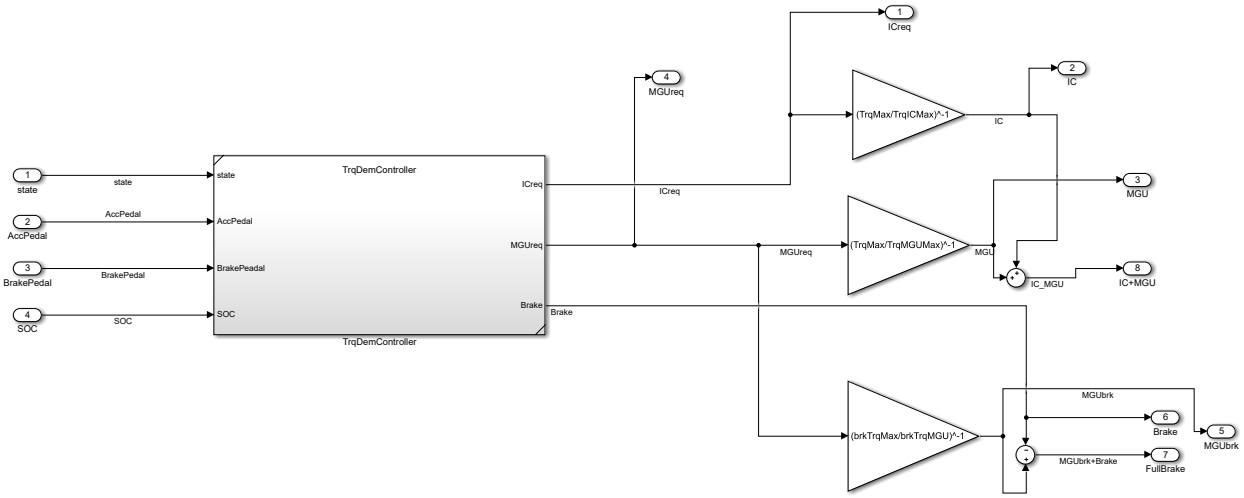
1.1.1. No Charge - 1

Test Details

Description	State under test: NO_CHARGE (1) INPUTS: - AccPedal: exponential growth and decay over time - BrakePedal: 0 - SOC: between 0 and 0.1 EXPECTED OUTPUT: Only the IC engine shall be commanded.

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings
Releases	Current

External Inputs

Name	File Path	Status
controllerInputs10.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs10.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			

Name	Source	Port Index	Plot Index
• ICreq	controllerModel/TrqDemController	1	

Configuration Settings Overrides

Configuration settings	Do not override model settings

Logical and Temporal Assessments

Assessments

Enabled	Name	Definition	Requirements
True	Assessment1	At any point of time, **ICreq <= AccPedal | ICreq <= 1** must be true	
True	Assessment2	At any point of time, **MGUreq == 0** must be true	

Symbols

Symbol	Scope	Metadata
ICreq	Signal	Name: ICreq Path: controllerModel/TrqDemController Port Index: 1 Field/Element:

Symbol	Scope	Metadata
AccPedal	Signal	Name: AccPedal Path: controllerModel/AccPedal Port Index: 1 Field/Element:
MGUreq	Signal	Name: MGUreq Path: controllerModel/TrqDemController Port Index: 2 Field/Element:

1.2. Dead

Test Details

Description	Dead case suite of tests

1.2.1. Dead - 1

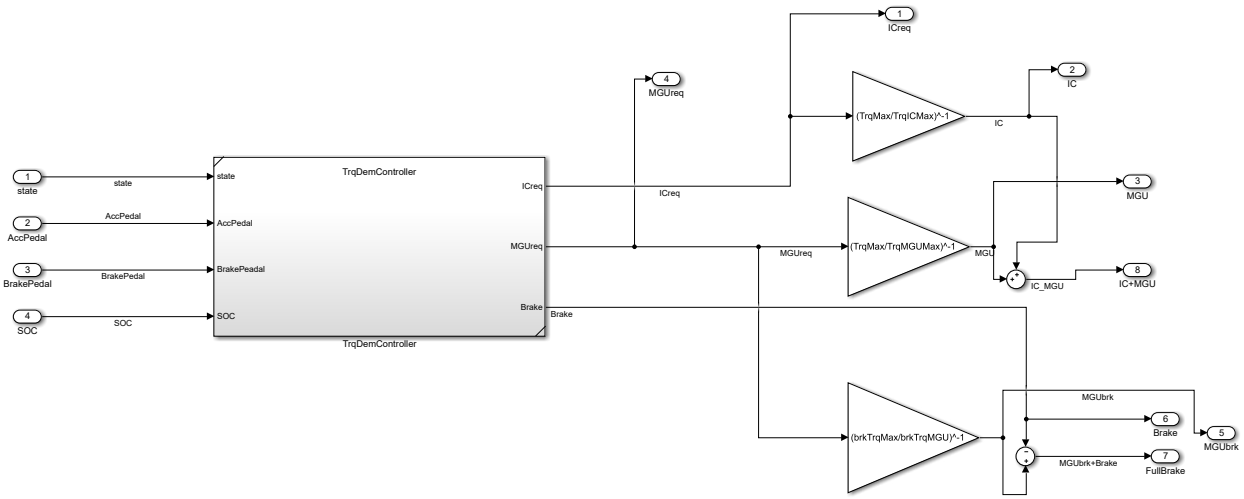
Test Details

Description	State under test: DEAD (0)

	INPUTS: - AccPedal: exponential growth and decay over time - BrakePedal: 0 - SOC: from 0.1 to 0 EXPECTED OUTPUT: Both ICreq and MGUreq shall be zero.

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings
Releases	Current

External Inputs

Name	File Path	Status
controllerInputs9.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs9.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			
• ICreq	controllerModel/TrqDemController	1	
• MGUreq	controllerModel/TrqDemController	2	
• IC_MGU	controllerModel/Sum	1	

Simulation Outputs

Override model settings

- Output

Configuration Settings Overrides

Configuration settings	Do not override model settings

Baseline Criteria

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
Dead_baseline.mat (Active)	0	0	0	0

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
• IC_MGU (Active)	0	0	0	0
• ICreq (Active)	0	0	0	0
• MGUreq (Active)	0	0	0	0
• ICreq (Active)	0	0	0	0
• IC (Active)	0	0	0	0
• MGU (Active)	0	0	0	0
• MGUreq (Active)	0	0	0	0
• MGUbrk (Active)	0	0	0	0
• Brake (Active)	0	0	0	0
• MGUbrk+Brake (Active)	0	0	0	0
• IC_MGU (Active)	0	0	0	0

1.3. Combined

Test Details

Description	Combined case suite of tests

1.3.1. Combined 1

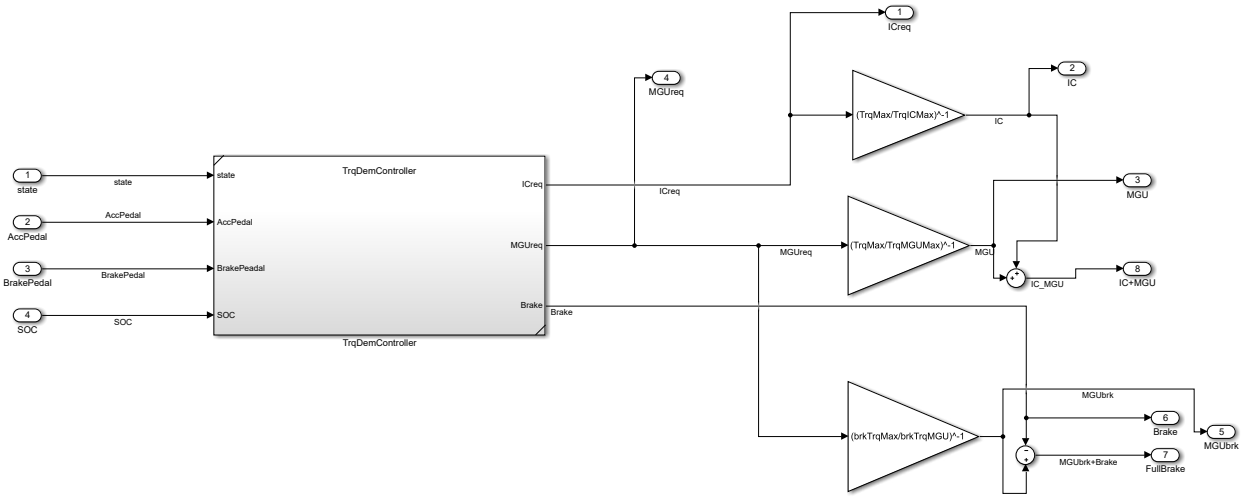
Test Details

Description	State under test: COMBINED (3), Scenario 1

	INPUTS: - AccPedal: pulse signal - Amplitude: 0.5 - Width: 0.5 - Period: 10 seconds - BrakePedal: 0 - SOC: 50% EXPECTED OUTPUT: Both ICreq and MGUreq shall be activated. Both the signals should not saturate.

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings
Releases	Current

External Inputs

Name	File Path	Status
controllerInputs1.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs1.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			
• IC_MGU	controllerModel/Sum	1	

Configuration Settings Overrides

Configuration settings	Do not override model settings

Baseline Criteria

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
Combined_Baseline1.mat (Active)	1.000000000000000	0	0.001	0.001

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
	01e-05			
• IC_MGU (Active)	1.00000000000000001e-05	0.001	0.001	0.001

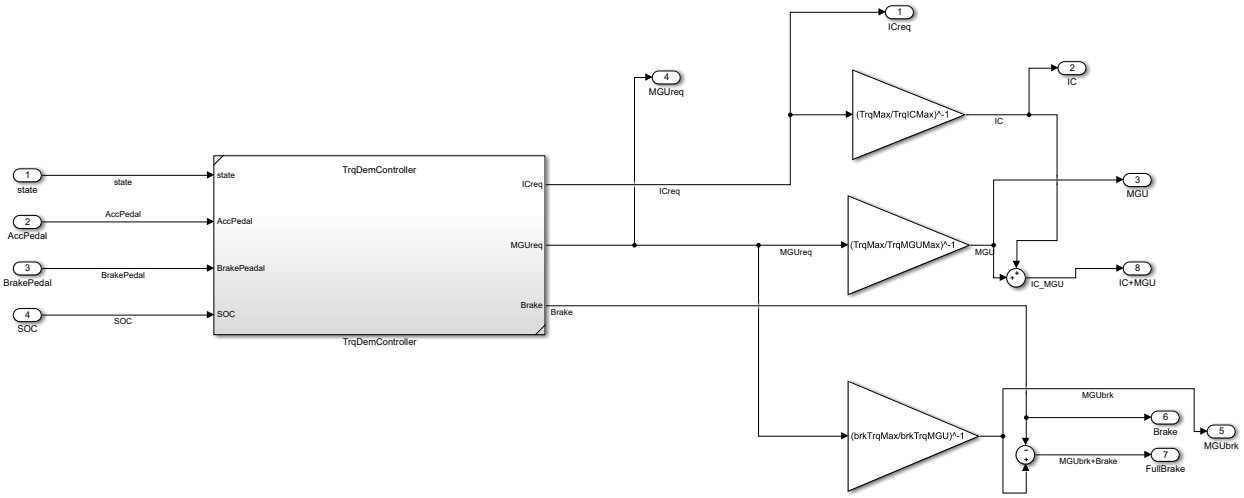
1.3.2. Combined 2

Test Details

Description	State under test: COMBINED (3), Scenario 2 INPUTS: - AccPedal: pulse signal - Amplitude: 0.1 - Width: 0.5 - Period: 10 seconds - BrakePedal: 0 - SOC: 50% EXPECTED OUTPUT: Both ICreq and MGUreq shall be activated.

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings
Releases	Current

External Inputs

Name	File Path	Status
controllerInputs2.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs2.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			

Name	Source	Port Index	Plot Index
• IC_MGU	controllerModel/Sum	1	

Configuration Settings Overrides

Configuration settings	Do not override model settings

Baseline Criteria

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
Combined_Baseline2.mat (Active)	1.00000000000001e-05	0	0.001	0.001
• IC_MGU (Active)	1.00000000000001e-05	0	0.001	0.001

1.3.3. Combined 3

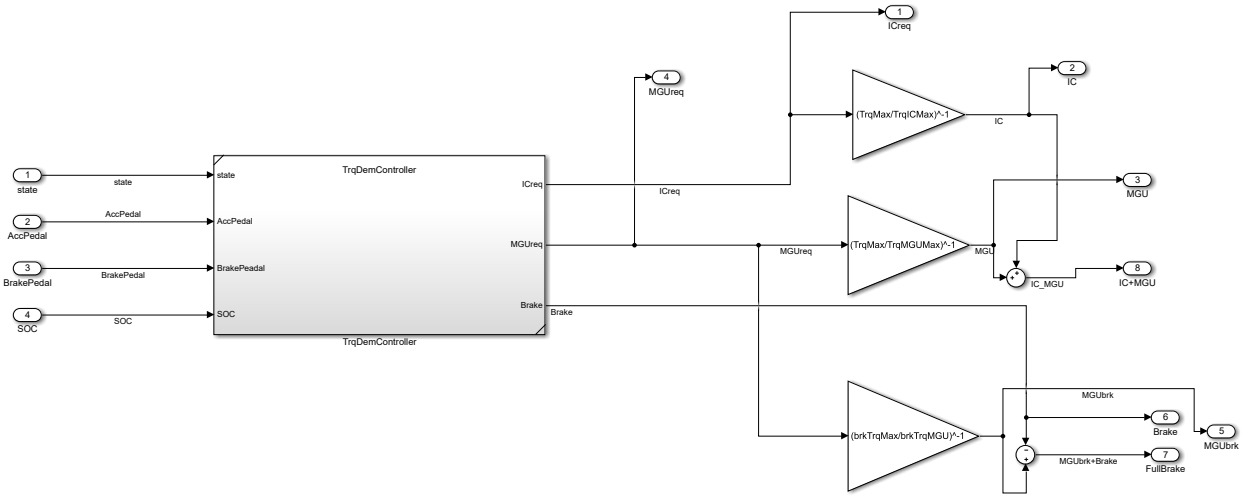
Test Details

Description	State under test: COMBINED (3), Scenario 3 INPUTS: - AccPedal: pulse signal

	- Amplitude: 0.9 - Width: 0.5 - Period: 10 seconds - BrakePedal: 0 - SOC: 50% EXPECTED OUTPUT: Both ICreq and MGUreq shall be activated.

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings
Releases	Current

External Inputs

Name	File Path	Status
controllerInputs3.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs3.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			
• IC_MGU	controllerModel/Sum	1	

Configuration Settings Overrides

Configuration settings	Do not override model settings

Baseline Criteria

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
Combined_Baseline3.mat (Active)	1.00000000000001e-05	0	0.001	0.001
• IC_MGU (Active)	1.00000000000000	0	0.001	0.001

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
	01e-05			

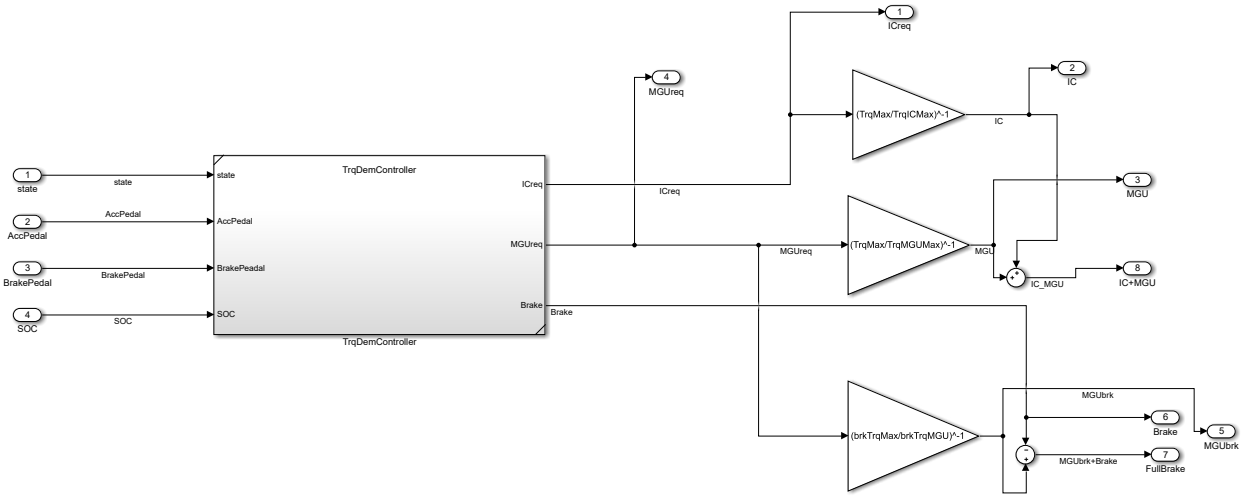
1.3.4. Combined 4

Test Details

Description	State under test: COMBINED (3), Scenario 4 INPUTS: - AccPedal: exponential growth and decay over time - BrakePedal: 0 - SOC: 50% EXPECTED OUTPUT: Both ICreq and MGUreq shall be activated.

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings
Releases	Current

External Inputs

Name	File Path	Status
controllerInputs4.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs4.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			
• IC_MGU	controllerModel/Sum	1	

Configuration Settings Overrides

Configuration settings	Do not override model settings

Baseline Criteria

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
Combined_Baseline4.mat (Active)	1.00 0000 0000 0000	0	0.001	0.001

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
	01e-05			
• IC_MGU (Active)	1.00000000000000001e-05	0	0.001	0.001

1.4. Regenerative Braking

Test Details

Description	Regenerative Braking case suite of tests

1.4.1. Regen 1

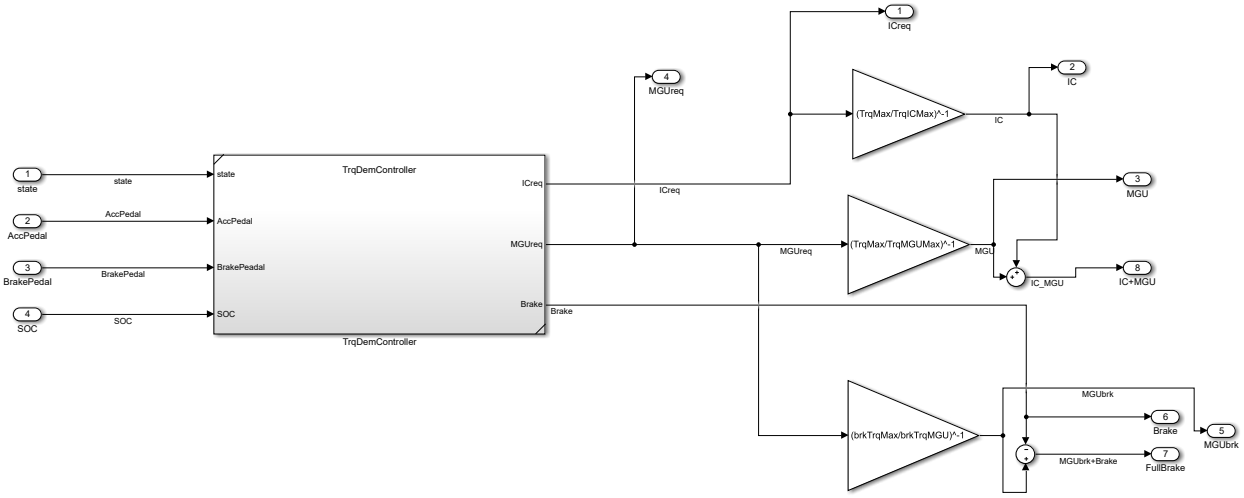
Test Details

Description	State under test: REGENERATIVE_BRAKING (4), Scenario 1 INPUTS: - AccPedal: 0 - BrakePedal: pulse signal - Amplitude: 0.5 - Width: 0.5 - Period: 10 seconds - SOC: 50%

	EXPECTED OUTPUT: State 4, Regenerative braking.

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings
Releases	Current

External Inputs

Name	File Path	Status
controllerInputs5.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs5.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			
• MGUbrk+Brake	controllerModel/Sum1	1	

Configuration Settings Overrides

Configuration settings	Do not override model settings

Baseline Criteria

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
Regen_Baseline1.mat (Active)	1.000000000000001e-05	0	0.001	0.001
• MGUbrk+Brake (Active)	1.000000000000001e-05	0	0.001	0.001

1.4.2. Regen 2

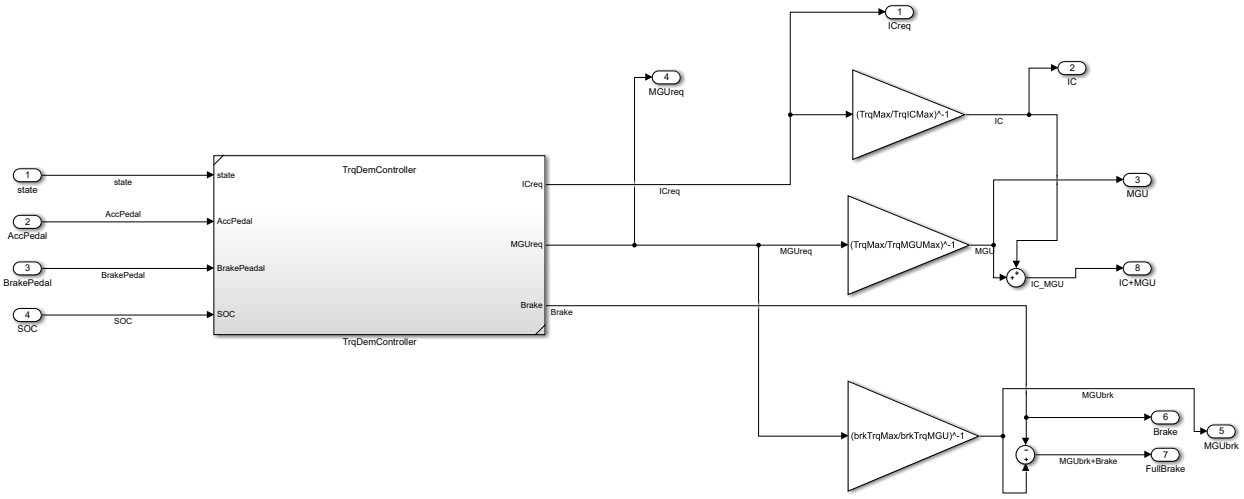
Test Details

Description	State under test: REGENERATIVE_BRAKING (4), Scenario 2

	INPUTS: - AccPedal: 0 - BrakePedal: pulse signal - Amplitude: 0.1 - Width: 0.5 - Period: 10 seconds - SOC: 50% EXPECTED OUTPUT: State 4, Regenerative braking.

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings

Releases	Current

External Inputs

Name	File Path	Status
controllerInputs6.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs6.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			
• MGUbrk+Brake	controllerModel/Sum1	1	

Configuration Settings Overrides

Configuration settings	Do not override model settings

Baseline Criteria

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
Regen_Baseline2.mat (Active)	1.00 0000 0000 0000 01e-05	0	0.001	0.001
• MGUbrk+Brake (Active)	1.00 0000	0	0.001	0.001

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
	0000 0000 01e-05			

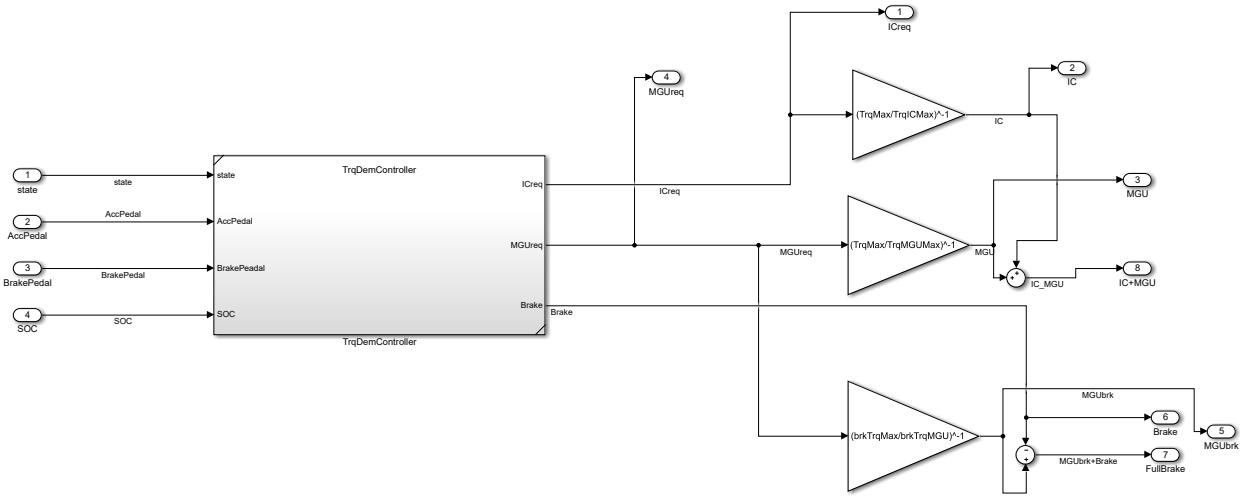
1.4.3. Regen 3

Test Details

Description	State under test: REGENERATIVE_BRAKING (4), Scenario 3 INPUTS: - AccPedal: 0 - BrakePedal: pulse signal - Amplitude: 0.9 - Width: 0.5 - Period: 10 seconds - SOC: 100% EXPECTED OUTPUT: State 4, Regenerative braking.

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings
Releases	Current

External Inputs

Name	File Path	Status
controllerInputs7.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs7.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			

Name	Source	Port Index	Plot Index
• MGUbrk+Brake	controllerModel/Sum1	1	

Configuration Settings Overrides

Configuration settings	Do not override model settings

Baseline Criteria

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
Regen_Baseline3.mat (Active)	1.00000000000000001e-05	0	0.001	0.001
• MGUbrk+Brake (Active)	1.00000000000000001e-05	0	0.001	0.001

Logical and Temporal Assessments

Assessments

Enabled	Name	Definition	Requirements
True	Assessment1	At any point of time, **MGUbrk == 0** must be true	

Symbols

Symbol	Scope	Metadata
MGUbrk	Signal	Name: MGUbrk Path: controllerModel/Gain1 Port Index: 1 Field/Element:

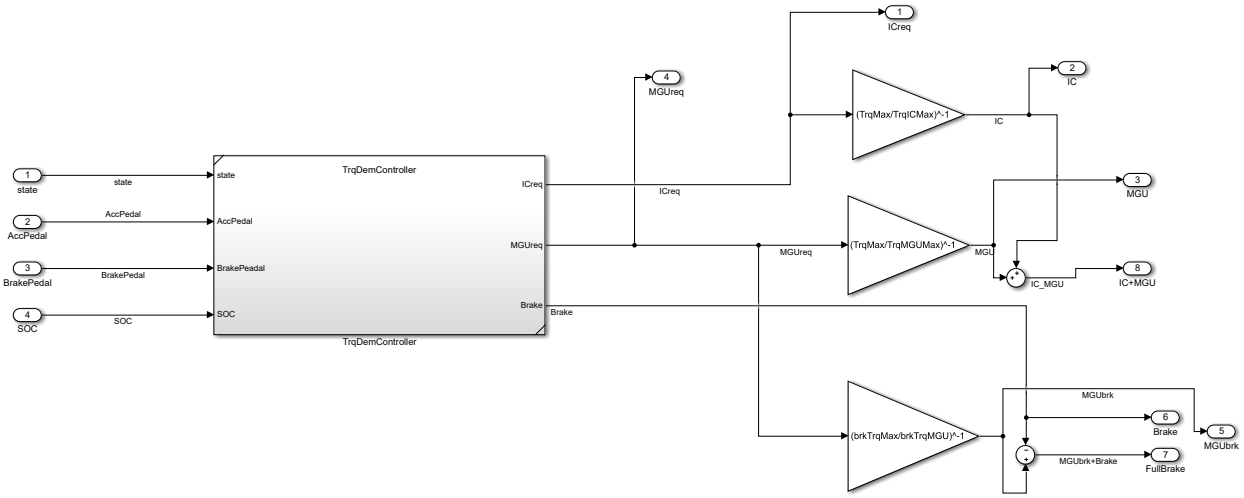
1.4.4. Regen 4

Test Details

Description	State under test: REGENERATIVE_BRAKING (4), Scenario 4 INPUTS: - AccPedal: 0 - BrakePedal: exponential growth and decay over time - SOC: 50% EXPECTED OUTPUT: State 4, Regenerative braking.

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings
Releases	Current

External Inputs

Name	File Path	Status
controllerInputs8.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs8.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			

Name	Source	Port Index	Plot Index
• MGUbrk+Brake	controllerModel/Sum1	1	

Configuration Settings Overrides

Configuration settings	Do not override model settings

Baseline Criteria

Signal Name	Abs Tol	Rel Tol	Leading Tol	Lagging Tol
Regen_Baseline4.mat (Active)	1.00000000000000001e-05	0	0.001	0.001
• MGUbrk+Brake (Active)	1.00000000000000001e-05	0	0.001	0.001

1.5. Electrical Drive

Test Details

Description	Electrical Drive case suite of tests

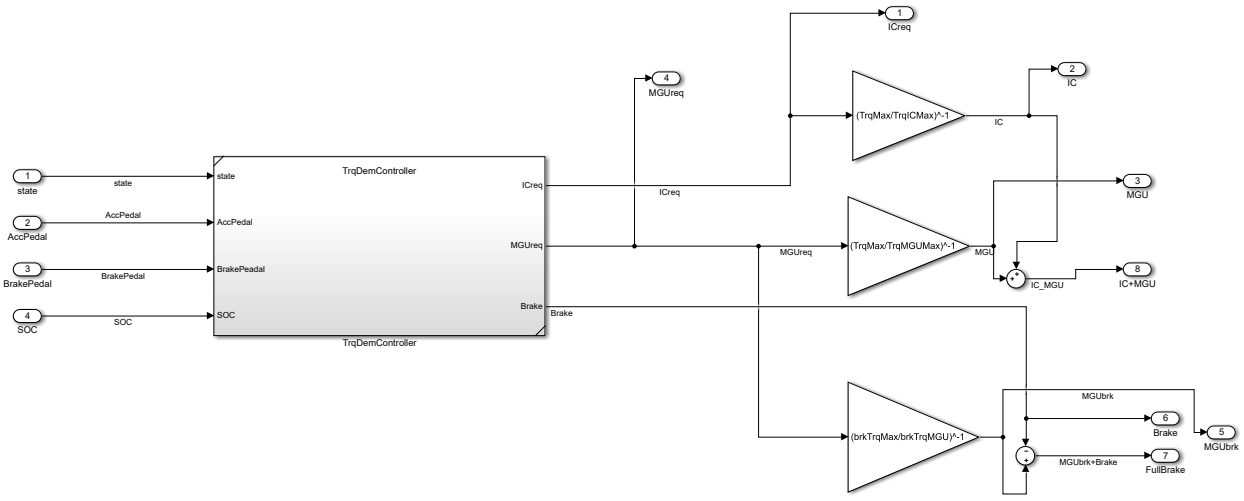
1.5.1. ED 1

Test Details

Description	State under test: ELECTRIC_DRIVE (ED, 2) INPUTS: - AccPedal: exponential growth and decay - BrakePedal: 0 - SOC: 70% to 15% EXPECTED OUTPUTS: - ICreq: 0 - SOC: 15%

System Under Test

Model Name: controllerModel



Simulation Settings Overrides

Simulation Mode	Model Settings
Releases	Current

External Inputs

Name	File Path	Status
controllerInputs11.mat (Active)	C:\Users\ivane\Documents\GitHub\hybrid-controller\Hybrid-controller\Test\ControllerTest\testScenarios\controllerInputs11.mat	Successfully mapped inputs.

Logged Signals

Name	Source	Port Index	Plot Index
Signal Set 1			
• MGUreq	controllerModel/TrqDemController	2	
• ICreq	controllerModel/TrqDemController	1	
• MGUbrk+Brake	controllerModel/Sum1	1	
• SOC	controllerModel/SOC	1	

Configuration Settings Overrides

Configuration settings	Do not override model settings

Logical and Temporal Assessments

Assessments

Enabled	Name	Definition	Requirements
True	Assessment1	At any point of time, **SOC >= 15 & BrakePedal == 0 & (MGUreq <= AccPedal | MGUreq <= 1)** must be true	
True	Assessment2	At any point of time, **ICreq == 0** must be true	

Symbols

Symbol	Scope	Metadata
SOC	Signal	Name: SOC Path: controllerModel/SOC Port Index: 1 Field/Element:
BrakePedal	Signal	Name: BrakePedal Path: controllerModel/BrakePedal Port Index: 1

Symbol	Scope	Metadata
		Field/Element:
MGUreq	Signal	Name: MGUreq Path: controllerModel/TrqDemController Port Index: 2 Field/Element:
AccPedal	Signal	Name: AccPedal Path: controllerModel/AccPedal Port Index: 1 Field/Element:
ICreq	Signal	Name: ICreq Path: controllerModel/TrqDemController Port Index: 1

Symbol	Scope	Metadata
		Field/Element