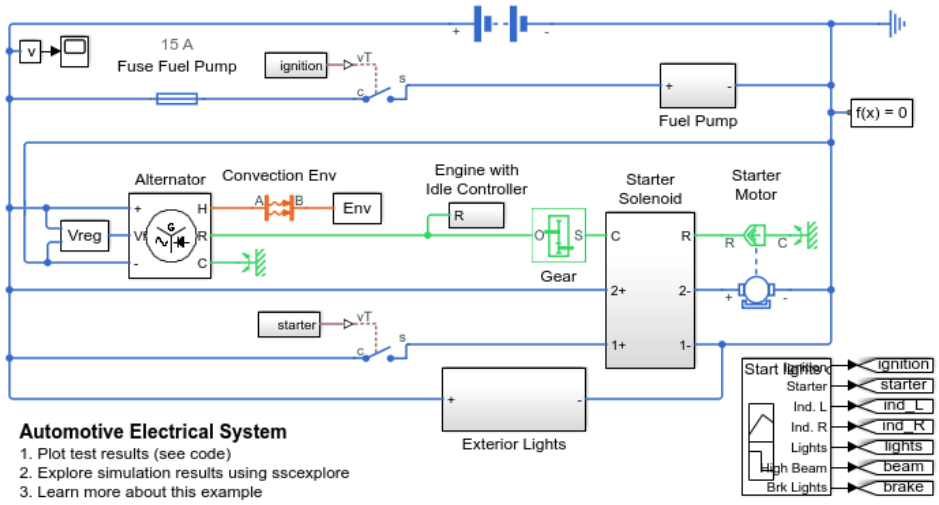
MATLAB Examples MathWorks®

Automotive Electrical System

This example shows a simplified dynamic model of an automotive electrical system. The mode contains electrical, mechanical, and thermal systems, and is able to simulate the effect of engine starting on the electrical network.

Contents

Model



Exterior Lights Subsystem

By MathWorks

Explore:
Simscape Electronics

Try it in MATLAB

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Related Examples

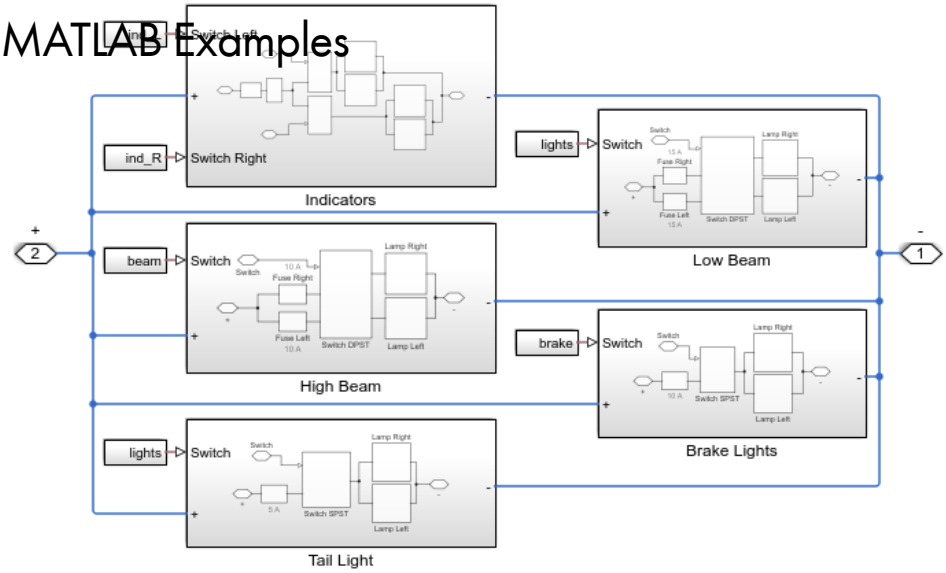
Power Split Hybrid Veh Electrical Network

This example shows the ba architecture of a power-spli transmission. The planetary along with the motor and g

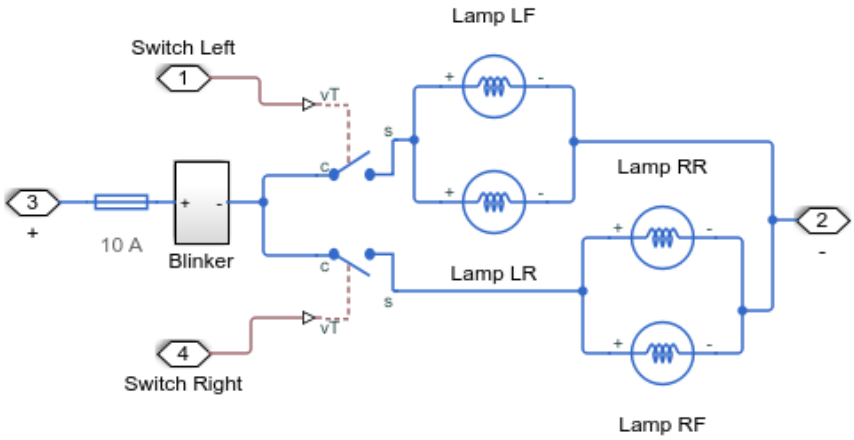
Energy Balance in a 48 Starter Generator

MATLAB Examples

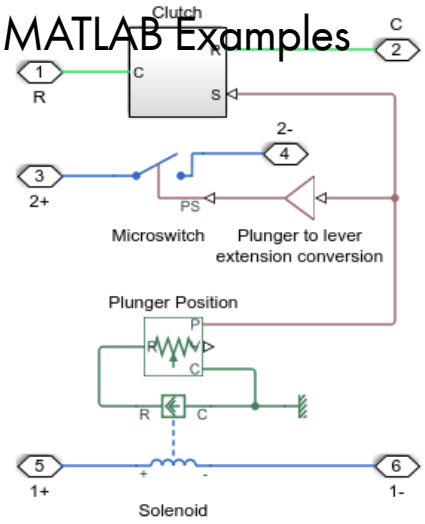
This example shows an int
permanent magnet synchr
machine (IPMSM) used as
starter/generator in a simpl



Indicators Subsystem



Starter Solenoid Subsystem

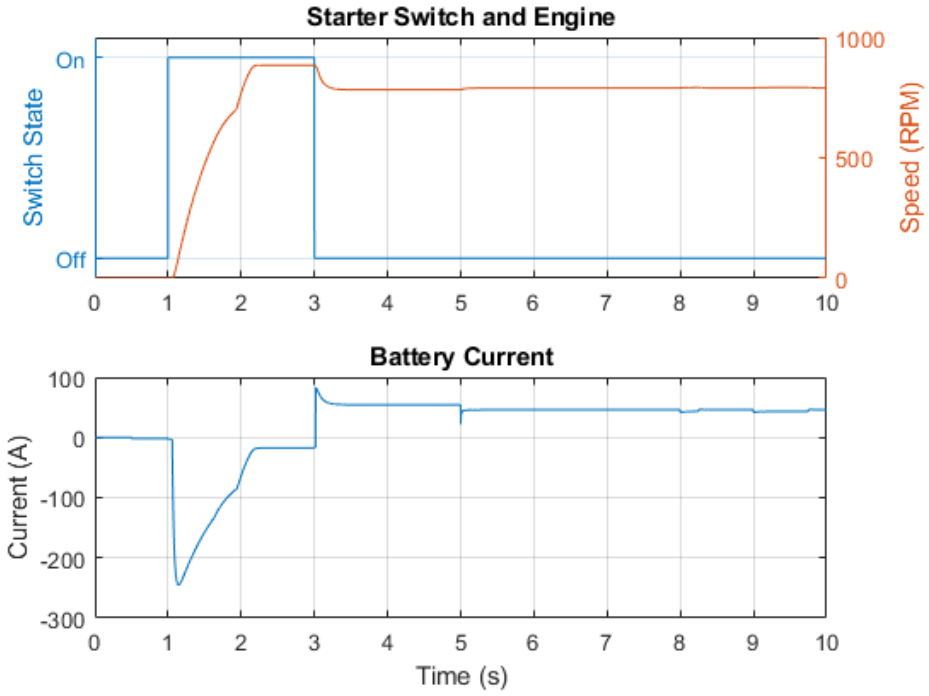


The clutch could be more accurately modeled using the Dog Clutch in Simscape Driveline(TM). Additionally, the Simscape Driveline Unidirectional Clutch could be used to ensure that once the engine catches it does not backdrive the starter motor.

Solenoid plunger has travel of 10mm. When plunger position is 10mm, the clutch is fully disengaged, and when the plunger is anywhere between 5mm and 0mm, the clutch is fully engaged. Switch closes and enables the starter motor only when the plunger is between 0 and 2mm.

Simulation Results from Simscape Logging

The plot below shows a startup sequence for an automotive electrical network. The starter motor is turned on, which draws current from the battery in order to start the engine. As lights and other electrical loads are turned on and off, the current draw from the battery varies.



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