Abstract

Vehicle simulations and hardware-in-the-loop simulations are performed to increase vehicle efficiency and performance while reducing development times and costs. Backward facing simulations of a series hybrid electric vehicle are performed to size powertrain components and optimize control strategy variables. Forward facing simulations of a conventional vehicle are performed to examine the effects of vehicle mass on engine operation. Simulations on a conventional vehicle with varying shifting schedules are performed using forward and backward facing calculations to examine the effects of calculation type on vehicle operation. Hardware-in-the-loop simulations of a battery electric vehicle are performed to verify and validate motor and motor controller operation. A method to perform closed loop hardware-in-the-loop simulations on a power absorbing eddy current dynamometer is explored.