Abstract

Besides the minimal (or zero) emission of the electric vehicles, their maintenance is much cheaper than the ones with internal combustion engine. The big disadvantage of the electric vehicles is the extremely high cost of producing and developing them. The electrical engine and the battery of the electric vehicles make their production that costly. Our goal is to provide long lifecycle and safe cars in compensation for the high prices. We can achieve this with the appropriate selection of the equipment and the correct monitoring and controlling of the system. One key element for the safety and long lifecycles is that the battery systems have to possess a correct charge and discharge profile.

The subject of my thesis is the development of the battery management system that can create a solution for the problem mentioned above. The chosen batterypack is the simplified model of the everyday ones used in electric cars. For the batterypack, I created an electrical circuit that can charge, discharge and balance the cells of the battery. In addition, the circuit can measure the voltage, current and temperature of the battery. The circuit can be controlled by an engine control unit (ECU) which we can control through a computer according to the measured values. For the communication between the ECU and the computer, I created a MATLAB/Simulink based framework.

The completed battery management system had been tested in various ways. By the end of the testing, most of the result turned out to be successful.

In my thesis work I created an idealized and simplified model of a real battery management system that can be used in modern electric vehicles with further developments.