

Prediction of Li-ion battery behavior

Transport technology is experiencing a considerable boom in connection with the more frequently used word of electromobility, which connects transport and electricity in one unit - the electrically powered vehicle.

One of the most important elements of an electrically powered vehicle is the energy accumulator that determines the main parameters of the vehicle - the radius of operation and power. Parameters of current lithium-based accumulators reach top values and this is precisely why the area of electromobility is developing so much nowadays.

The design of the battery system for a specific traction application requires knowledge of detailed battery parameters that are not always

available. This project can count on a laboratory workplace for measuring basic parameters of lithium cells - discharge characteristics, charging characteristics and internal resistance. All parameters can be measured depending on a temperature of 0-40°C. For a detailed design of the battery system, a simulation can be performed to predict behaviour in the real application.

The basis of each simulation is a suitable circuit model that needs to have its parameters set. In the current Matlab simulations, the so-called Thevenin circuit model is used. The parameters of this model are obtained by its own measuring station. Li-ion LiFePO4 battery system of the experimental railway vehicle is used for verifying the results of simulations •

