Höcherl & Hackl
The electronic load

eCARus Electrically Driven Vehicle

Since summer semester 2009 students of the faculty of Electrical Engineering and Information Technology of the Technical University of Munich are developing an electrically driven vehicle in a project called eCARus. The project which was originally established from Professor Herzog of the Institute of Energy Conversion Technology provides the students primarily a free development platform. By now the project has a very high reputation at the faculty. Thus eCARus gains additional professional support from the chair of Electrical Energy Storages of Professor Jossen.

Thereby the responsibilities for all technical areas - from Drive Engineering to Information Engineering – are lying in the students' hands which are also responsible for the project organization. Already after the first semester the vehicle was able to drive on base of a Buggy-Chassis. During the ensuing period the battery management a graphical user interface and a four-wheel drive could be realized. Besides the ongoing extension of the drive train a test stand was established which is able to simulate a rear axle with the aid of identical motors and converters. A real time calculated model of the vehicle which is connected to the test stand permits a verification of the engine under realistic conditions. The integration of an electronic load in conjunction with a programmable power supply allows the simulation of the vehicle's real battery in the test stand. Up to now it was only possible to measure the provided engine energy from the power supply. This measurement data were used to reproduce the dynamic behaviour of the battery in the test stand. The previous model only examined the continuous discharging of the battery. With the integration of the electronic load it is now possible to simulate the short-term energy recovery into the battery which occurs in recuperation phases.

Additionally it is now possible to drive the engines as a generator and to measure and store the arising energy with the aid of the electronic load. of the vehicle in a realistic manner on the test stand The determined measurement data flow into the SOC model as well and produce a rise of the charging state. Now the system provides the possibility to examine the behaviour of the vehicle in a realistic manner on the test stand. The implementation of the recuperation into the eCARus vehicle was one of the big goals for the winter semester 2010/11. To simplify the practical realization and to avoid unwanted effects like overloading of the battery, dozens of tests still have to be done on the test stand. The integration of the electronic load acts thereby as a useful facility for an extended simulation of the drive train and only allows the practicable integration of the individual components.

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