

Design and Development of a Configurable Intelligent Battery Sensor for Different Vehicles and Battery Chemistries



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Keywords: IBS Algorithm for EV & Micro Hybrid Vehicle, SOC SOH SOF Algorithm, Battery Characterisation Test

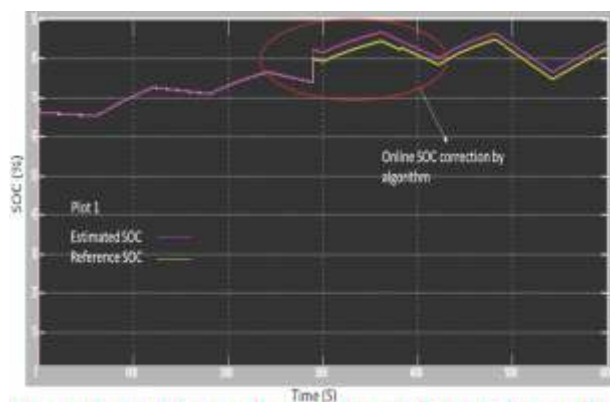
Abstract:

To develop the battery algorithms – SOC, SOH and SOF configurable for battery chemistry and vehicle configuration, studied common parameters which are same over the battery chemistry and vehicle configuration.

For Various battery chemistries, battery characterisation tests procedures recommended by international test standards are almost same, even the parameters which are related to estimate SOC, SOH algorithm are also remain same. Example: Battery capacity, OCV vs SOC characteristics, hysteresis characteristics, Resistance trend etc.

Battery algorithm directly uses these parameters and operating limits of the batteries as input to estimate the algorithm. Methods being used in the algorithm for various chemistry is also same but the conditions, set point and look-up tables makes the algorithm to respond in different way for various battery chemistries. Example: SOC algorithm – basic common methods are used for many battery chemistries like Coulomb Counting, Direct and Book-keeping Combination, Resistance based OCV estimation, SOC correction from OCV etc., SOH algorithm is estimated from change in internal resistance of the battery from new to old, for various batteries are same.

In this project, on lead acid battery – characterization tests were performed to collect battery characteristics data – lookup tables and to understand operating trend on selected Micro-hybrid Vehicle configuration. Derived minimum number of battery characteristics data required to make the battery algorithm configurable and compatible to work on various battery chemistries and vehicle configurations. Mostly, lead acid (AGM) type batteries are used for engine cranking application. Here, studied the lead acid battery characteristics and developed the algorithm for lead acid battery – Micro hybrid application.



Online SOC estimation and correction By algorithm



SOH/SOF algorithm estimation on Thermal aged battery