PHD thesis: Observers for diagnosis and state of health estimation of Li-ion batteries

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Expected skills: Matlab, automatic control, electrical engineering, signal processing.

Lithium-ion (Li-ion) batteries are at the heart of our daily lives, powering everything from smartphones to electric vehicles. Their performance and longevity are crucial, both for consumers and for industries. However, these batteries are subject to degradation over time and use. To guarantee their safety and optimize their lifespan, innovative diagnostic solutions are constantly evolving.
The objective of this thesis is to evaluate existing methods and propose innovative methods for obtaining the state of charge (SOC), state of power (SOP) and state of health (SOH) of Li-ion batteries.

The approaches will focus on methods using automatic control tools (notably observers) on models ranging from the cell, the module to the battery pack.
Model-based observers use available measurements (voltage, current, temperature) and the model to estimate non-measurable internal variables.

The objective is then to bring together observer methods and methods using artificial intelligence (data-driven approach).

Bibliographie :

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