Preparation

Model Establishment

Sensitivity Analysis

Detail Workflow

Continuity algorithm

Preparation

identify the research subject :the endurance of smart phone battery

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improve the backwards existing methods

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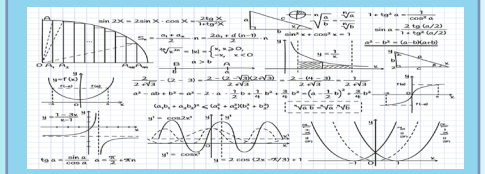
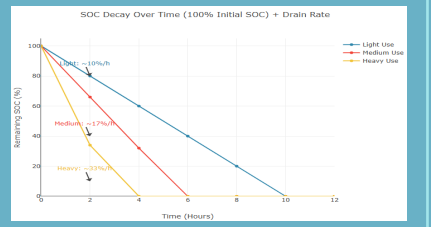
Describe the changes by differential equations



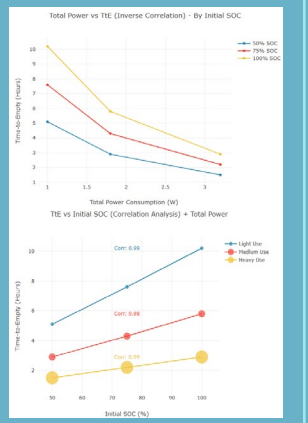
Model I: Dynamic state model of battery based on coupled differential equations

1.Equivalent circuit model (ECM) construction.
2.Thermal coupling model.
3.Terminal voltage output equation.
4.Numerical solution fourth-order Runge-Kutta method (K4).



Model II: TTE prediction model based on stochastic process

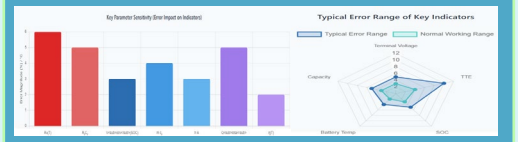
1.Multi-scene power decomposition framework.
2.Continuous-time Markov chain (CTMC).
3.Monte Carlo simulation.
4.Termination condition definition: adopt double criterion



Sensitivity Analysis

Calculate the normalized sensitivity index for the parameter perturbation experiment.

The achievement of full-link modeling from battery micro-dynamics to macro-range prediction



The Sobol index variance decomposition quantifies the contribution of the parameters to the variance

Suggestion:Implement Model Predictive Control to balance performance and energy efficiency