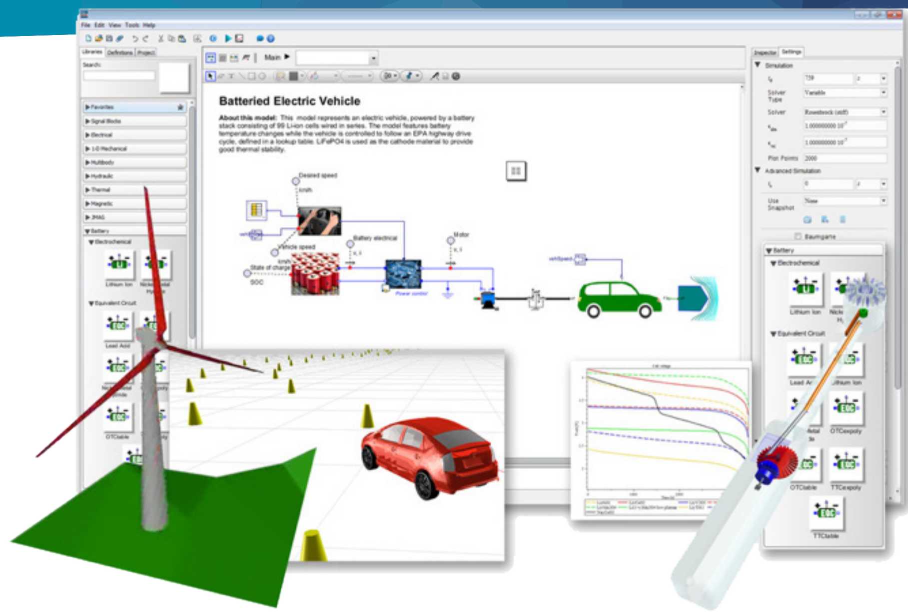
MapleSim Battery Library

Battery Modeling & Analysis

The MapleSim Battery Library allows for the development of physics-based predictive models of battery cells that can be implemented within a multidomain system. With these models, companies can understand the loading effect on the battery as it undergoes many different duty cycles and how it will behave as part of the greater system. In addition, they will gain a better understanding of the heat flow in the battery, how rising temperature and age affects efficiency, and what are the critical factors that could cause runaway. Equipped with this knowledge, engineers can adjust their designs to optimize performance and reduce risks of undesirable effects.

The MapleSim Battery Library can be used in any modeling project that involves batteries, including consumer electronics, electric and hybrid-electric vehicles, power electronics, energy generation and storage, and more.



Why Use the Battery Library?

The MapleSim Battery Library allows you to incorporate physics-based predictive models of battery cells into your multidomain system-level models:

- Save time and avoid problems by taking battery behavior into account early in your design process.
- Understand the loading effect on the battery as it undergoes many different duty cycles and how the battery will behave as part of the greater system.
- Gain a better understanding of the heat flow in the battery, how rising temperature and age affects efficiency, and what critical factors could cause thermal runaway.
- Results in efficient, high-fidelity system models suitable for use in real-time and hardware-in-the-loop applications

The Battery Library features include:

- Supports full electrochemical physics and equivalent-circuit models (Li-ion, NiMH, lead-acid)
- Electrochemical physics models include chemistries for:

  Li-ion:

  Cathode: LiCoO2 (LCO), LiNiO2 , LiMn2 O4 (LMO), LiMn2 O4 (lowplateau), LiFePO4 (LFP), LiV2 O5 , LiTiS2 , LiWO3 , NaCoO2 , LiNi0.8Co0.2O2 , LiNi1/3Mn1/3Co1/3O2 (NMC), LiNi0.8Co0.15Al0.05O2 (NCA)

  Anode: LiC6 (Graphite), Li4 Ti5 O12 (LTO)

  NiMH
- Support for State of Health (SoH) studies
- Captures thermal effects through an optional heat port, allowing a complete thermal circuit
- Parameter identification tools for determining model parameters
- Incorporates voltage profile, state of charge, thermal, capacity fading, distribution of electrode active materials, distribution of electrical potential, side reactions, and more

Visit www.maplesim.com for product information, application stories, demo videos, a demo gallery, and more.

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