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Simcenter FLOEFD power electrification module

Digital Industries Software, works inside computer-aided design (CAD) software to simulate fluid flow and heat transfer using 3D CAD models without the need for data translations or copies. Its new power electrification module provides more accurate modeling of batteries for Simcenter FLOEFD users.

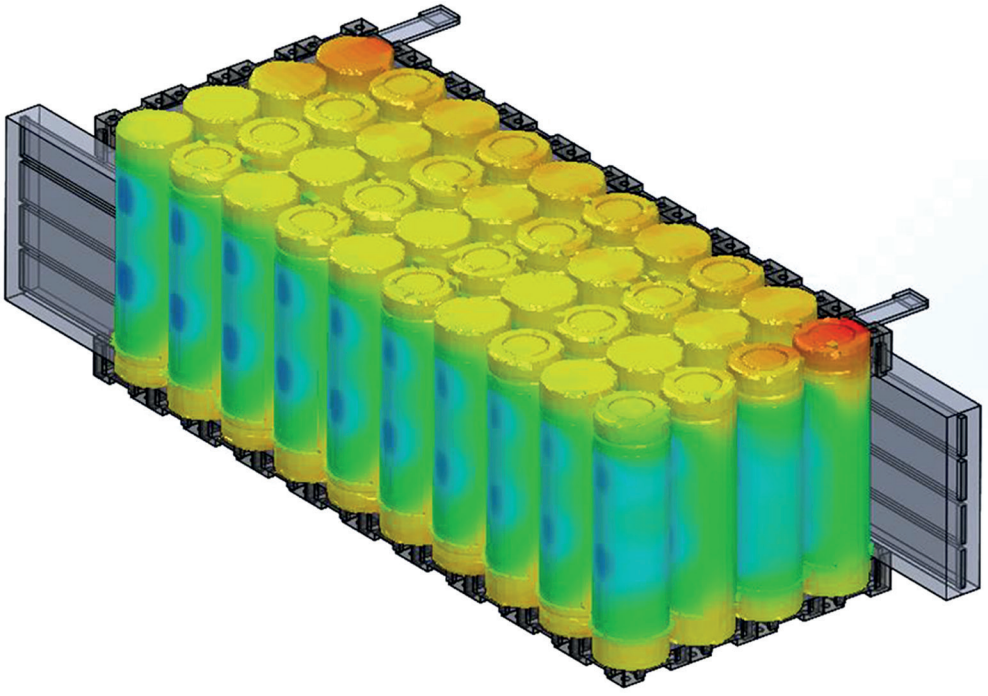
Power electrification module provides more accurate battery cell modeling

Benefits

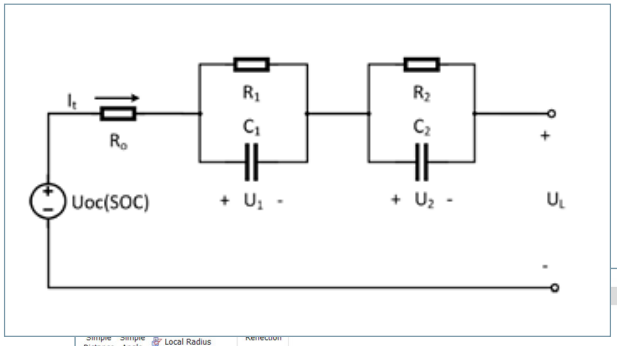
- Accurate battery cell modeling
- Obtain heat dissipation rate of battery cells based on charge/discharge power and cell properties applied to it
- Predict state of charge, voltage, current, temperature distribution in the battery cell

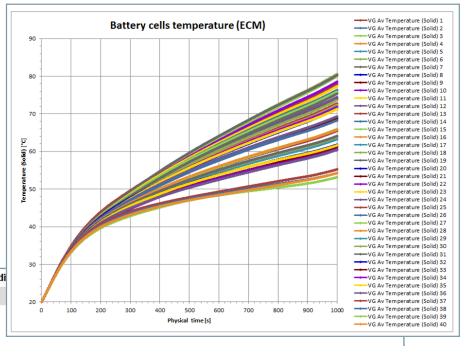
Summary
Simcenter™ FLOEFD™, the award-winning frontloading computational fluid dynamics (CFD) software from Siemens

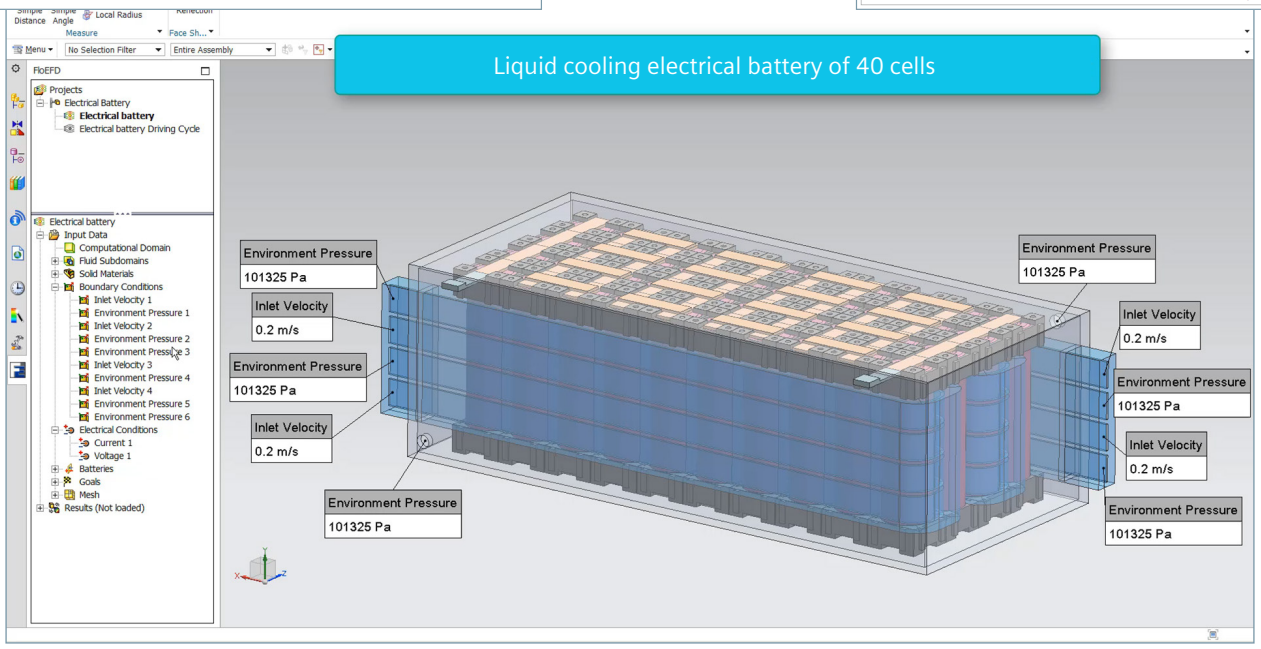
Power electrification
The battery compact model in the power electrification module calculates the heat dissipation rate based on the electrical or electrical-chemical characteristics of battery cells. The two new models are:



Simcenter FLOEFD power electrification module







- The equivalent circuit model, which represents a cell as a second-order resistor-capacitor (2RC) equivalent circuit model. The model inputs are open circuit voltage (OCV), resistance and capacitance values as functions of state of charge and temperature
- The electrochemical-thermal coupled model simulates the battery cell's thermal and electrochemical behaviors and requires the electrolyte's chemical properties

In both models, the obtained heat dissipation rate is applied to the battery cell. The state of charge, voltage, current and temperature distribution in the battery cell is then predicted.

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