Wide Range of Phenomena Dictate Different Computational Demands

- 2D thermal-electro-chemical coupled physics based model
- Improved Safety
- Precise SOC
- Accurate SOH
- Advanced BMS
- Better Cell-Balancing
- Time Remaining
- Efficient reformulation
- Different capacity fade mechanisms

BMS Implementation

- Battery Voltage, Current
- Temperature
- Battery charging/discharging
- Power Source/Sink
- Control Hardware
- CAN message for charging/discharging
- CAN interface

Mathematical Reformulation

- Coordinate Transformation
- Orthogonal Collocation
- Original System 3000-10000 DAEs
- Reduces into Analytical Solutions
- Final System 30-10 DAEs

Recent Publications and Codes


Thermal Model Results

- Model validated at different operating temperatures
- Reformed model validated with COMSOL for low aspect ratios
- Model based control will provide optimal charging protocols

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