A new method for battery characterization

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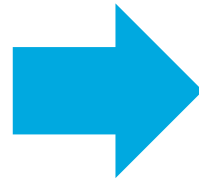
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Battery

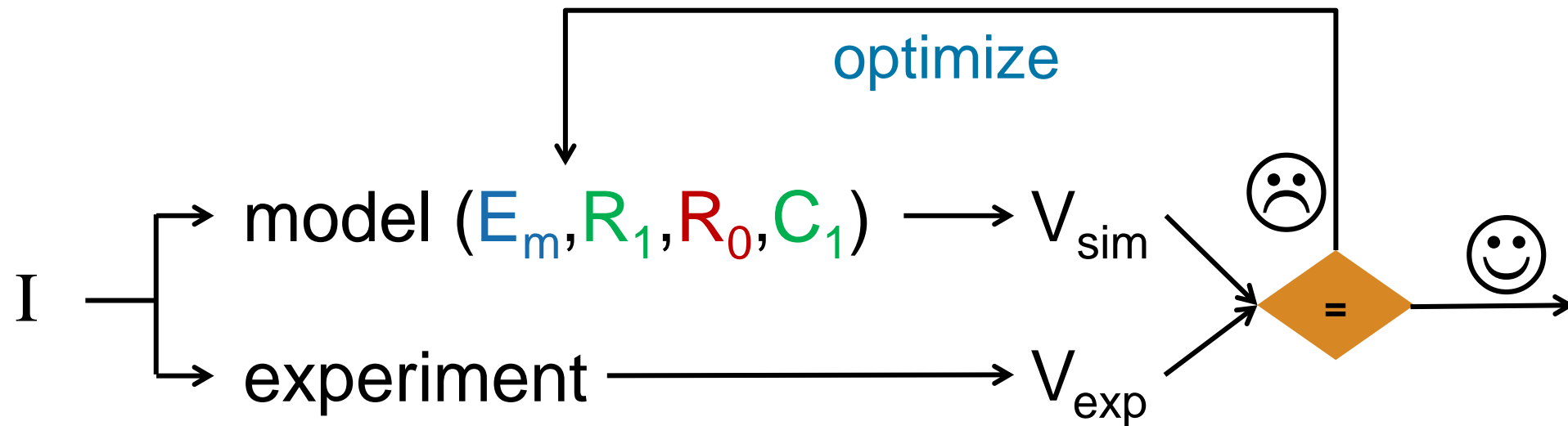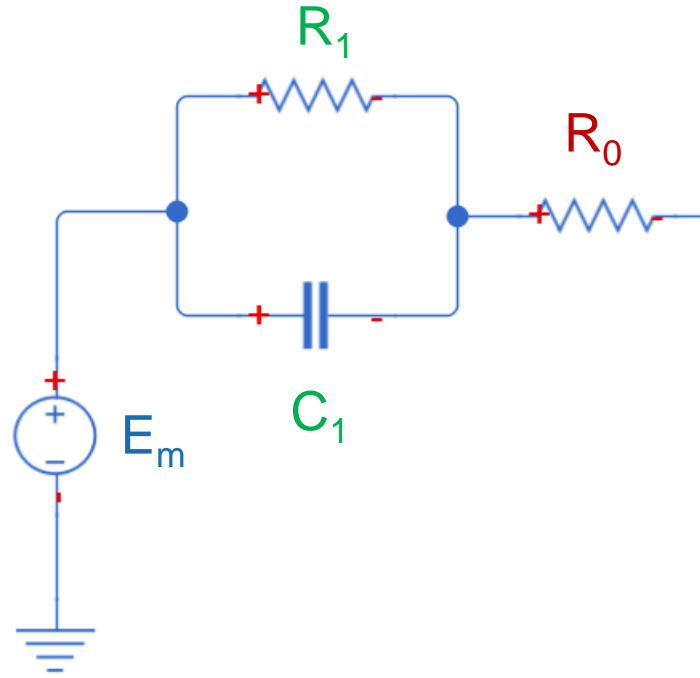- Expensive part of EV
- Nonlinear behavior
- Aging

Cell Characterization

OCV

R_0

R_k

τ_k

hysteresis

thermal mass

?

Parameter estimation
Parameter identification
Model calibration

Summary of Cell Characterization Methods

Method	Speed	Temperature and SOC Levels	Require Considering Initial Polarization?	Require Preprocessing?
Curve Fitting Toolbox	Fast	One T and one SOC at a time	Yes	MATLAB Scripting
Parameter Estimator in Simulink Design Optimization	Slow	One T at a time	No	No
New Method ?				

Cell Characterization with Model-Based Calibration

Comparison

Method	Speed	Temperature and SOC Levels	Require Considering Initial Polarization?	Require Preprocessing?	
Curve Fitting	Fast	One T and one SOC at a time	Yes	MATLAB Scripting	
Parameter Estimator in Simulink Design Optimization	Slow Hours	One T at a time	No	No	Beyond ECM (equivalent circuit model)
Model-Based Calibration Toolbox	Fast Minutes	All at once	No	No	

Take-Aways

- Model-Based Calibration
    - Method for Battery Parameter Estimation
    - Efficient
    - Especially suitable for look-up tables

Thank you

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