Integrated electric vehicle battery thermal management

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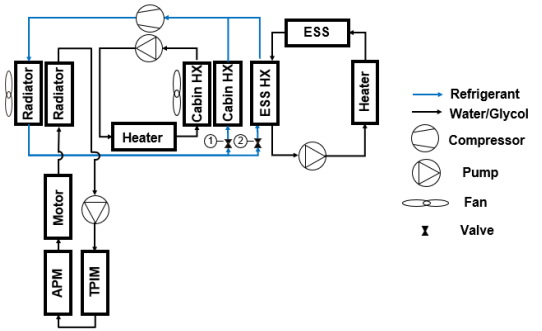
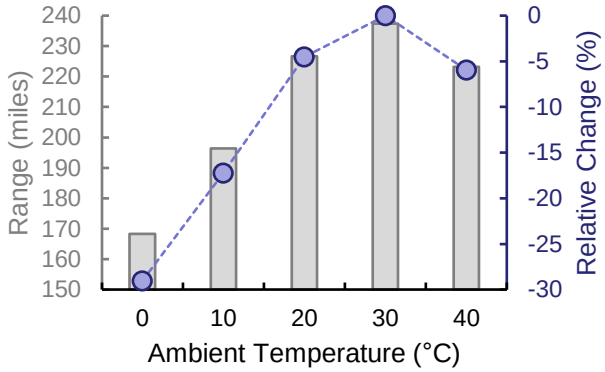
Objective

Investigate and optimize EV thermal management systems across a wide range of ambient and driving conditions.

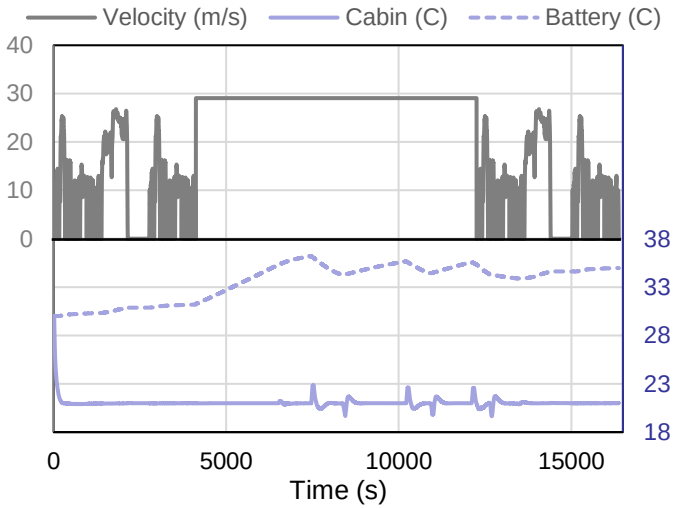


Approach

- Establish of a baseline thermal management cycle for comparison to alternatives
- Comprehensive dynamic modeling of the EV system
- Parametric investigations across different ambient and control setpoint temperatures



Parametric investigation of ambient temperature effect on range of the baseline system



Transient results plotted for the J1634 Multi-Cycle Test methodology

Impact

- Flexible transient baseline system identified, capable of wide range of parametric investigation
- Modeling platform for identification of optimal EV thermal management systems across wide range of operating conditions

Selected Publications

T.J. Shelly, J.A. Weibel, D. Ziviani, and E.A. Groll, “A dynamic simulation framework for the analysis of battery electric vehicle thermal management systems,” The IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm), Orlando, FL, USA, May 26 - 29, 2020.

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