

EMPOWER Project – Electric Machine Power Loss Modelling for Simulation and Control

Partners: LiU, Volvo GTT, Scania CV, BorgWarner, Aurobay

Researchers: Lars Eriksson

Challenges:

Electric machines are critical components that enable high efficiency of the vehicles and is a key property easing the transformation toward electromobility. When aiming for energy efficiency and sustainability, improving the precision of energy consumption evaluation and advancing the optimization and control strategies of electric machines is important. Consequently, accurate modelling of power losses is essential for reliable performance prediction, design optimization, and efficient control of electric machines and vehicles.

Goals:

This research proposes to extend and refine mathematical models for losses in electric machines with a particular emphasis on their use in vehicle level energy efficiency evaluation and control optimization.

Approach:

This project will extend a newly developed electric machine model (Eriksson 2025) in two steps: 1) by formulating it using dimensionless quantities, 2) examining the validity of the model on a larger set of electric machines suited for electromobility.

