

# **A Methodology for Quantification of Fuel Reduction**

## **Potential for different Driving Strategies**

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### **ABSTRACT**

Driving strategies in terms of acceleration or deceleration of vehicles determine fuel consumption and energy recuperation, especially for hybrid vehicles. Next to the driver, who does not always adapt the optimal driving strategy, technical systems can recommend an optimal strategy or provide an optimised longitudinal vehicle control, e.g. for ACC systems. The additional degree of freedom within the power train of hybrid vehicles can be utilised in intelligent driving strategies.

Within this paper a methodology on how to quantify the fuel reduction potential for different driving strategies in different driving scenarios is described. This methodology can be applied for hybrid vehicles and conventional power train vehicles as well.

In a first step reference measurements of different drivers are recorded in order to determine the baseline for the quantification of the possible fuel reduction potential against a realistic reference. Afterwards the representative average driver for each scenario is derived from these measurements. Together with the reference profiles of the slowest and the sportiest driver out of these velocity profiles input values for the simulation of different driving strategies are generated. Therefore a simulation model of the hybrid vehicle and a model of the scenarios are available in MATLAB/SIMULINK. The vehicle model represents the power train of the hybrid vehicle and allows a calculation of fuel consumption and the state of charge of the hybrid battery.

Within this paper different strategies in two different scenarios are presented as examples. The fuel reduction potential of each driving strategy is calculated and a comparison between the results is provided.

The methodology is applied for designing fuel consumption optimised ACC systems in conventional and hybrid vehicles.