

Estimation of Pressure in an All-Wheel-Drive system

Background

BorgWarner is an automotive supplier with headquarters outside of Detroit, USA. At the site in Landskrona, drivetrain- and four-wheel-drive systems are developed and produced for passenger vehicle manufacturers around the world.

One of the products BorgWarner is developing in Landskrona is an All-Wheel-Drive (AWD) system, which is actuated using a hydraulic pump. An important property of the hydraulic system of the AWD is the pressure producing a torque. Since the pressure cannot easily be measured, it needs to be estimated from other available signals, such as the speed of the actuator or the current.

BorgWarner is looking to improve the accuracy of the estimated pressure, and we believe that there is a potential for using machine learning techniques to capture non-linear dynamics that are not included in the current estimation model.

It is therefore interesting to develop a model estimating the pressure in the hydraulic AWD system from measured data using Machine Learning techniques and comparing the estimation to the current model.

Tasks

- Collect data needed for the estimation model by measuring on a test-stand.
- Implement and validate a nonlinear model estimating pressure from other data (e.g., motor speed, current) using a Machine Learning strategy using MATLAB / Simulink.
- Compare the implemented estimation model with the existing model.

The master thesis shall be performed at BorgWarner, Landskrona.

Prerequisites: System Identification, Machine Learning, MATLAB Simulink, Mathematical Modelling.

Result

The thesis outcome should be a written report, simulation models, and an oral presentation at BorgWarner.

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