

Electric motor assistance for AMT shifts

Master Thesis at Vicura

Vicura, an engineering company originated from General Motors (GM) Powertrain and Saab Automobile Powertrain AB. Started as an independent company VICURA AB on Jan 4th 2011, majority owned by [Fouriertransform AB](#). Vicura is offering product development with focus in transmission, electric drive and control systems and has a global customer base.

Background

AMT (Automated Manual Transmission) is a type of automatic gearbox that is essentially a conventional manual transmission, but the clutch and gear shift is controlled automatically by a control system. One difference with driving a car with AMT compared to a conventional automatic transmission is the torque interruption that occurs when shifting. This torque interruption can be filled by means of an electric motor that is either connected to the same axis as the combustion engine or separately, for example to the rear axle of a front-wheel drive car.

Thesis goal

The purpose of this thesis is to investigate how to fill the torque interruption that occurs at AMT gear change with an electric motor, where the electric motor and combustion engine is coupled to the drive shaft.

Method

The work basically consists of the following parts:

1. Model identification of system including the control principle, i.e. AMT and electric motor including control systems. Define also the overall torque control principle. This includes investigating what requirements must be met to obtain acceptable driveability, such as measurability (eg torque accuracy), controllability (step response), communication speed, etc.
2. Develop simulation environment of above system.
3. Implement the control algorithm from the above investigation that is most optimal for controlling the target system. Verify the results from above investigation.

Suitable background

M.Sc. D, Y, E, Z, or equivalent. Appropriate prerequisites: Good theoretical (and preferably practical) knowledge in relevant areas such as control engineering, mechatronics, simulation and modeling. Number of students: 2

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