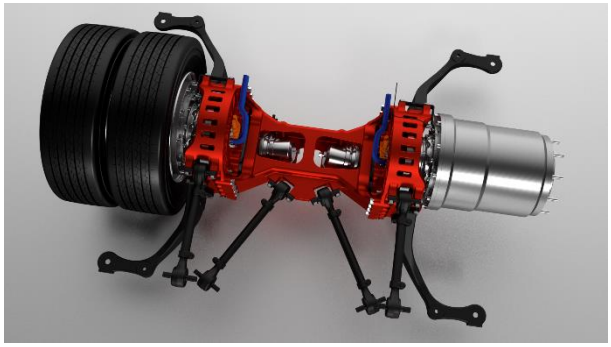
e-Traction, Apeldoorn

Internship/Graduation Assignment:

Fractional Slot Synchronous Reluctance Machine for Electric Powertrain



Founded in the Netherlands e-Traction offers superior technology in e-mobility and related services that is based on solid expertise and experience. Since 1981 the key focus has been to commercialize and integrate innovative and state of the art e-mobility solutions.

We developed a unique electric in-wheel powertrain technology which offers the essence of pure direct drive power. With our sustainable technology only a bare minimum of components is required to reach the highest efficiency level. The simplicity of our drivetrain is the ultimate sophistication.

Assignment description

e-Traction develops a unique electric in-wheel powertrain technology that offers the essence of pure direct drive power for heavy and light duty automotive applications such as city buses, urban distribution vehicles, airport modalities and SUV's. These vehicles are propelled by TheWheel®, a direct-drive in-wheel motor system that integrates a permanent magnet synchronous motor (PMSM) with power electronics and fluid cooling into a wheel. e-Traction is constantly on the lookout for opportunities to make this product more robust, more efficient, and more powerful.

Description

Nowadays PMSMs are the most commonly used motors for electric vehicles for their high torque densities. Nevertheless, synchronous reluctance machines (SynRMs) have attracted increasing attention from the automotive industry due to their robust structure and relatively low price. Most SynRMs discussed in literature are incorporating an integer-slot design with distributed windings, resulting in relatively large winding heads and hence a high end-winding loss and limited active length. This project is primarily aimed at a study on the feasibility of implementing concentrated windings into fractional-slot SynRMs, followed by the design of such a SynRM for a specific electric powertrain.

Deliverables

Report including:

- State of the art of SynRMs
- Feasibility study of fractional-slot SynRMs with concentrated windings
- Design and optimization of a fractional-slot SynRM for a specific electric powertrain

Simulation models

Profile

- Master level engineering, preferred Electrical Machines and/or Electronics
- Prerequisites: Permanent Magnet Synchronous Machines (PMSM), Finite element analysis (FEA) modeling.

Duration:

Option 1: three-month internship
Option 2: nine- to twelve-month graduation project

Compensation:

Yes

For more information regarding this assignment, contact dr. Yang Tang, MSc,
T. +31 (0)55 521 11 11 - y.tang@e-traction.com