

Internship Offer M/F (6 months)

Study of a Control of Multiphase Motor
(Ref RPE092018)

Supervisor

Mitsubishi Electric R&D Centre Europe: M. Rémi PERRIN, Researcher (r.perrin@fr.mercede.mee.com).

Background

MITSUBISHI ELECTRIC R&D CENTRE EUROPE is the European R&D centre from the Corporate R&D organisation of MITSUBISHI ELECTRIC. The aim of our centre is to provide advanced R&D support to the Japanese R&D centres and to the business units of MITSUBISHI ELECTRIC CORPORATION.

Situated at the heart of Europe's leading R&D community, MITSUBISHI ELECTRIC R&D CENTRE EUROPE includes two entities: one in France, one in UK, and conducts R&D into next generation communication systems and technologies related to Energy and Environment. Design of power converter is a major activity in the Power Electronic System division.

Internship Description

In the wide range of electric motors, MITSUBISHI ELECTRIC R&D CENTRE EUROPE France wishes to develop solutions for the HVAC application, its POKI-POKI motor is based on a modular structure of synchronous machine with a wound rotor. The attractive principle of this motor in the power scaling of a synchronous wounded rotor machine by series or parallel association of the elementary power modules in the rotor and stator. Each module consists of a coiled ferromagnetic pad supporting its autonomous electronic power supply.

In a prospective approach, the objective of this internship is the study, the design and the test of a control of a 7-phase brushless wounded rotor synchronous machine (BWRSM). The implementation of the control will be done by a DSP or FPGA. It may be done on Labview depending on the previous knowledge of the student.

Organisation

The internship will take place in the MITSUBISHI ELECTRIC R&D CENTRE EUROPE premises, located in Rennes.

At first, the student will realize a state of the art on the control of polyphase synchronous machines. Subsequently, she/he will evaluate the current FPGA program for an open loop control and the VHDL function blocks associated. This evaluation will be based partly on the team's knowledge. Following this work, the student will implement the closed-loop control based on an innovative algorithm in VHDL. The student will also work on a Matlab to perform the algorithm.

Then, a vector control closed-loop will be implemented in the targeted motor. Finally, she/he will take part in the test of the prototyped controller on the synchronous motor.

Supervised by a Researcher, the student will be supported by the knowledge and the scientific equipment of the PES (Power Electronic System) team. The student will enjoy the dynamic and innovative context of a research center.

Prerequisites

- ✓ Engineer/Master level student with interest in research;
- ✓ Capability of analysis of a complex problem;
- ✓ Strong interest in power electronic conversion;
- ✓ Strong interest in control of rotating machines;
- ✓ Strong interest for experimentation and technical design;
- ✓ First experience in coding DSP/FPGA;
- ✓ Determination;
- ✓ Synthesis skills;
- ✓ Autonomous, but team player;
- ✓ English: spoken / written.

Duration: 6 months

Project start: Feb/March 2019 (depending on schools)

Contact : Madam Magali BRANCHEREAU (jobs@fr.mercede.mee.com)

Please send a CV and Motivation letter in pdf format indicating the Reference of this offer (*RPE092018*). An internship contract must be signed with your school / university so you must still have the student status to apply to this offer.