Dipartimento Energia
Power Electronics Innovation Center (PEIC)
Politecnico di Torino

We are looking for a master student to work on

Parametric Design and Simulation of Surface Permanent Magnet Motor with Halbach Magnet Configuration

Background

Permanent magnet synchronous machines (PMSMs) are a standard in the automotive sector. Among PMSMs, the surface-mounted permanent magnet (SPM) machines offer high torque density and are widely adopted for high-performance motors. The Halbach configuration of the PM allows to further increase the PM flux density (and so the torque density), without the increase of PM mass.

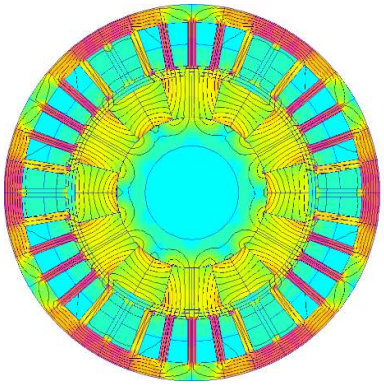

Figure 1 - Example of SPM motor with Halbach PM array configuration

The aim of the thesis is to include this kind of motor in SyR-e (https://github.com/SyR-e/syre_public) the open-source design and simulation framework developed in Matlab from PEIC members. At the moment, SyR-e covers other types of electric motor, from Synchronous reluctance motor to interior and surface-mounted permanent magnet motors and induction motor.

Your tasks

- Literature review on the design and applications of SPM motors with Halbach PM array;
- Geometric parametrization of the rotor geometry in SyR-e;
- Design comparison of Halbach SPM with standard SPM design, on available benchmark.

Necessary skills

- Knowledge of electrical machines and electric drives
- Basic Matlab programming;
- Problem-solving and attitude to team-working
- Previous experience in FEA simulation is a plus.

What you will learn

- To analyze state-of-the-art technical literature;
- The basic principle of electrical machine design;
- How to set up and FEA simulation of electric motor and use the FEA results to estimate the motor performance figures
- To work in a team and cooperating on a common project.

Duration of the thesis: 6 months

Application: We are looking forward to receiving your application. Please include your CV and a short explanation why you fit the position (Italian or English). Send your application to Simone Ferrari (simone.ferrari@polito.it) and Gianmario Pellegrino (gianmario.pellegrino@polito.it)