ABSTRACT

QUISPE A., Martha R. *Study of different approaches for driving a Permanent Magnet Synchronous Motor without speed sensor*. 087f. Dissertação de mestrado em Engenharia Eletrônica) - Faculdade de Engenharia, Universidade do Estado do Rio de Janeiro (UERJ), Rio de Janeiro, 2019.

This dissertation addressed the study of different approaches for driving a Permanent Magnet Synchronous Motor (MSIP) without speed sensors. Essentially, four different approaches based on Field Oriented Control (FOC) were implemented. The first one was implemented with a position sensor to acquire the frequency and the speed of the motor. In sequence, three different approaches based of sensorless control techniques were implemented. In the second (considering the order of presentation in the text), the speed was estimated through a synchronizing circuit labelled as IPLL (Improved Phase-Locked-Loop). The IPLL input signals were the rotor flux represented in $\alpha - \beta$ coordinate system. To the remaining two approaches, artificial intelligence techniques based on Neural Networks, from two different databases, were applied to estimate. The first database were the acquired signals from the sensor used in the first approach. The second database derived from the estimated speed by the IPLL. Based on the simulation results obtained through different ways of estimating the motor speed, it was verified the feasibility of using neural networks to estimate correctly the motor speed, even through different databases.

Keywords: Permanent Magnet Synchronous Motor; Mechanical Speed Estimator; Neural Networks; Field Oriented Control (FOC).