The Simulation of an Induction Motor in Transient Behavior Taking into Account the Saturation Effect

Ileana Calomfirescu

"Politehnica" University of Bucharest, Bucharest, Romania, ileana.calomfirescu@yahoo.co.uk

Abstract— It is known the fact that for a digitally controlled induction machine, taking into account the saturation effect implies some unknown elements, like the nonlinearity of the magnetization curve. In this paper is studied the induction motor in transient behavior considering the saturation effect (the nonlinear expression between the magnetization inductance L_m and the magnetization current I_m). This has been possible by creating an optimization program developed in Matlab. Also there had been used data from laboratory tests, but because of the laboratory conditions the induction motor could not be used at the given rated values. The Matlab program is linked to another program, developed in Simulink, thus obtaining the electromagnetic torque, the stator and rotor currents in A-B-C three phase coordinates system and the stator and rotors currents in d-q orthogonal coordinates system, the mechanical velocity, the rotors current pulsation, the electrical slip. To begin, there had been used the Clark and Park transformations, because the usage of constant orthogonal voltages simplifies the program. Then there were used the stator and rotors currents equations. For the mechanical part of the induction motor were calculated the viscosity coefficient and the inertial moment. There had been created several subsystems in which was introduced the optimization made for the induction motor.