

Magnetic Field Analysis of External Rotor Permanent-Magnet Synchronous Motors with Non Magnetic Rotor Core

Authors : Mabrak Samir

Abstract : The motor performance created by permanent magnetic in a slotless air-gap of a surface mounted permanent-magnet synchronous motor with non magnetic rotor and either sinusoidal or mixed (quasi-Halbach) magnetization is presented in this paper using polar coordinates. The analysis works for both internal and external rotor motor topologies, The effect of stator slots is introduced by modulating the magnetic field distribution in the slotless stator by the complex relative air-gap permeance, calculated from the conformal transformation of the slot geometry. We compare predicted results of flux density distribution and cogging torque with those obtained by finite-element analysis.

Keywords : air-cored, cogging torque, finite element magnetic field, permanent-magnet

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020