

# Influence of the Magnetic Materials on the Behavior of Traction Motors for Vehicle Propulsion

Marius-Daniel Calin, Marius Georgescu and Carmen Lungoci

Transilvania University of Brasov/Department of Electrical Engineering and Applied Physics, Brasov, Romania  
marius.calin@unitbv.ro, mgeorg2011@yahoo.com, lungoci@unitbv.ro

*Abstract*— To have a suitable sustainability in large urban areas, a balance between resources, technology and environment must be provided. Thus, efforts to create new means of an environmentally friendly transport with performance and efficiency improved and with a reduced consumption of materials are opportune. Optimal operation and efficiency of electrical machines used as main vehicle propulsion sources are closely related to performance of soft and hard magnetic materials used to build them. Respecting this, new researches and developments are focused on new magnetic materials with superior performances, as rare earth based alloys ones. This paper presents theoretical and practical aspects regarding the magnetic material influence on electrical traction characteristics, taking into account the demagnetization process specific for permanent magnet (PM) traction motors. The demagnetization curves for NdFeB permanent magnets are obtained and their implications on optimal design of magnetic circuits of permanent magnet synchronous machines (PMSM) are analyzed. An assignment of two types of PM traction motors is effectuated taking into account their behavior related to the traction characteristics.