

Performance improvement of torque characteristics using the Multi Type Interior Permanent Magnet motor

The torque characteristic of the novel Multi Type Interior Permanent Magnet (MTIPM) motor that can be operated as permanent magnet stepper (PMST) and dc brushless motor (BLDC) configuration is presented. It briefly presents the structural characterization and the derivation of performance characteristics of the machine from the first principles. This motor is designed as a high torque performance motor that can be used as an in-wheel motor for agriculture applications such as tractors. BLDC motors exhibit characteristics of generating high torque at high speed while the PMST has characteristics of generating high torque at low speed. The typical characteristics of the above two are integrated in the MTIPM structure with a complex control structure that handles the switching complexity and speed control in real time. The evaluation of the performance characteristics of the proposed machine is presented. The result shows significant improvements of the practical torque range.