

Analytical 2-D Model of Slotless Brushless Machines with Spoke-type Permanent Magnets

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Abstract

A two-dimensional analytical model is proposed for slotless brushless machines with arc-shaped spoke permanent magnets assisted by hub magnets to calculate the magnetic field distribution due to magnets and armature reaction, the electromagnetic torque, and back electromotive force. To verify the model, the analytical results of the field distribution, electromagnetic torque and back electromotive force have been compared with those achieved from finite element method. Moreover, this model is used as an equivalent analytical model for a cubic spoke motor, and it is shown that the proposed equivalent sub domain model satisfactorily estimates the electromagnetic quantities.

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