A novel double-stator permanent magnet generator integrated with a magnetic gear

ABSTRACT

This paper presents a double-stator permanent magnet generator (DSPMG) integrated with a novel magnetic gear structure which is proposed to be used as a direct drive generator for low speed applications. Torque transmission is based on three rotors consisting of prime permanent magnet poles on the middle rotor and field permanent magnet poles on the inner and outer rotors, respectively. The proposed machine combines the function of a triple rotor magnetic gear and electrical power generator. The operating principle of the generator is discussed, and its performance characteristics are analyzed using 2-dimensional finite-element method (2D-FEM). Analysis results about its magnetic gear ratio, transmission torque, cogging torque and electrical power performance are reported. The 2-D finite element analysis results verify the proposed generator design.

Keyword: Double-stator permanent magnet generator; Magnetic gear