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Rotating pole piece magnetic gear with low torque ripple

M. F. M. A. Halim; E. Sulaiman; R. Aziz

— Author & Article Information

a) Corresponding author: mohd.firdaus@utem.edu.my
b) erwan@uthm.edu.my
c) roziah@uthm.edu.my

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Rotating pole piece magnetic gear (RPMG) employs flux modulation principle to rotate a ferromagnetic pole piece instead of the conventional permanent magnet. Unlike the conventional coaxial magnetic gear (CMG), RPMG exhibit high torque ripple due to inherent problem when a reluctance force is engaged. This paper proposed a RPMG with low torque ripple using pole pair combination strategy. Two structures with gear ratio “7.66” are evaluated to demonstrate this technique. 2D finite element is used to simulate the torque ripple. The least common multiple (LCM) verified the finding obtained from the simulation. The torque ripple percentage achieved in this study is less than 1%. This study validate that RPMG can match the performance of CMG when pole pair combination is taken into consideration.

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