

Analysis of Three and Five-phase Double Stator Slotted Rotor Permanent Magnet Generator (DSSR-PMG)

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Abstract

This paper discusses the performance of three and five-phase double stator slotted rotor permanent magnet generator (DSSR-PMG). The objective of this research is to propose five-phase DSSR-PMG structure that could minimize output voltage ripple compared to three phase. In this research Finite Element Analysis (FEA) is used to simulate the characteristic of the three and five-phase permanent magnet generator at various speeds. The characteristic of back-EMF, flux linkage, cogging torque and flux density for three and five-phase configurations is presented. As a result, five-phase DSSR-PMG shows a lower cogging torque and voltage ripple compared to three-phase. The cogging torque for five-phase is 80% lower than three-phase DSSR-PMG and the ripple voltage (peak to peak) of back-EMF in five-phase is 2.3% compared to the three-phase DSSR-PMG which is 55%.

Keywords: Double stator, Permanent Magnet, Slotted Rotor

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