

Analysis of Different Arrangements of Flux Barriers and Different Pole Pairs in a Stator with Concentrated Winding

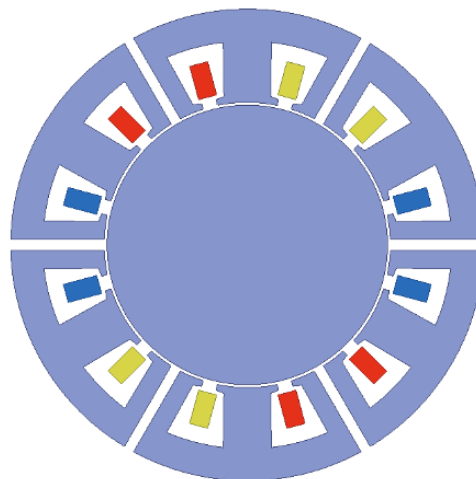
J. Gerold¹ and D. Gerling²,

¹FEAAM GmbH, D-85579 Neubiberg, Germany

²Universitaet der Bundeswehr Muenchen, D-85579 Neubiberg, Germany

Abstract - This paper presents a novel stator design to reduce harmonics in the air-gap flux density of electrical machines with concentrated windings and further to improve the electromagnetic performance. The stator contains magnetic flux barriers in its teeth region to increase the amplitude of the fifth harmonic and is applied for a 12-teeth/10-poles PM machine with a three phase single layer concentrated winding. Compared with the conventional design and a 12-teeth/14-poles PM machine with and without flux barriers the new machine design shows significant improvements concerning the performance, power density and efficiency.

Keywords— Tooth concentrated winding, MMF harmonics, magnetic flux-barrier, permanent magnet synchronous machines, finite element method.



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