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Eddy Currents in Windings of Switched Reluctance Machines

By Christian Carstensen

Shaker Verlag Mai 2008, 2008. Taschenbuch. Book Condition: Neu. 21x14.8x cm. Neuware - Within this work a switched reluctance traction drive was investigated at the Institute for Power Electronics and Electrical Drives (ISEA) in Aachen. Three different winding geometries were applied to the prototype machine. Measurements resulted in distinct differences of machine efficiency (88.5 %, 90.5 %, 93.4 %), obviously originated in different eddy current losses. The publication of Klauz is the first and only known work in which eddy currents in switched reluctance machines were calculated by finite element simulations. The average copper losses of a low voltage machine with four turns per coil were found to vary by over 600 % between the different conductors. Klauz' results confirm clearly the need to consider eddy current losses in the design process of new machine designs. However, the presented simulation models need to be built manually for each investigated geometry. Thus, a variation of the winding geometry implies an unreasonable effort. Moreover, solely single pulse operation was investigated. The main objective of this thesis lies in the development of a universal simulation process for switched reluctance machines that includes eddy current losses and allows the operation with different control structures...



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